



HP Elite x2 1013 G3 Tablet with Collaboration Keyboard

Maintenance and Service Guide

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Product notice

This user guide describes features that are common to most models. Some features may not be available on your computer.

Not all features are available in all editions of Windows. This computer may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows functionality. Go to <http://www.microsoft.com> for details.

Software terms

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For any further information or to request a full refund of the price of the computer, please contact your seller.

Safety warning notice


 **WARNING!** To reduce the possibility of heat-related injuries or of overheating the device, do not place the device directly on your lap or obstruct the device air vents. Use the device only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The device and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950-1).

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1 Product description

Category	Description
Product Name	HP Elite x2 1013 G3 Tablet with Collaboration Keyboard
Processors	Intel® Core processors Intel Core i7-8650U, quad core Intel Core i7-8550U, quad core Intel Core i5-8350U, quad core Intel Core i5-8250U, quad core Intel Core i3-8130U, dual core
Graphics	Intel UMA graphics: Intel UHD Graphics 620
Panel	13.0", WLED, UWVA, 450 nits, eDP 1.4+PSR, 72% CG, ultraslim, touch screen WUXGA+ (1920 x 1280), anti glare, privacy 3k×2k (3000×2000), BrightView
Memory	LPDDR3 1866 fine-pitch ball grid array (FBGA) package with 178 balls LPDDR3 2133 fine-pitch ball grid array (FBGA) package with 178 balls Supports dual channel memory Supports up to 16 Gb Supports the following configurations: LPDDR3 1866 8 Gb LPDDR3 2133 16 Gb 32 Gb
Primary storage	Supports M.2 2280 Solid-State Drive (SSD) 128 GB, SATA-3, TLC 256 GB, SATA-3, self-encrypting drive (SED), Opal 2, TLC 256 GB, PCIe 256 GB, PCIe, TLC 512 GB, PCIe, self-encrypting drive (SED), Opal 2, TLC 512 GB, SATA-3, TLC, federal 512 GB, PCIe, TLC

Category	Description
	1 TB, PCIe, TLC
Audio/visual	HP Bang & Olufsen Audio
	Audio Solution Codec CX8400
	Microphone (3 mic array)
	RGB camera (select models only):
	<ul style="list-style-type: none"> Front-facing camera, 5 MP with LED indicator Rear-facing camera, 8 MP
	IR camera (select models only):
	<ul style="list-style-type: none"> Front-facing camera IR
	Two stereo speakers
Digital pen	Active Pen with App Launch Button (select models only)
Ethernet	No direct Ethernet support - Ethernet via accessories
Wireless	WPAN Bluetooth
	Bluetooth® 4.2 only supported via combo card
	WLAN
	WLAN options via soldered minicard connector (PCIe/USB):
	<ul style="list-style-type: none"> Intel Dual band wireless-AC 8265 802.11AC 2x2 WiFi + BT 4.2 Combo Adapter (non-vPro) Intel Dual band wireless-AC 8265 802.11AC 2x2 WiFi + BT 4.2 Combo Adapter (VPro)
	WLAN antennas (2) (world wide 5 band, configured at top of panel on all models)
	Bluetooth Disabled IOPT
	Support for Wi-Fi Specific Absorption Rates (SAR) in BIOS
	Compatible with Miracast-certified devices
	Support S3/S4 Wake on wireless LAN
	Supports WLAN/LAN/WWAN switching
	Support HP Connection Optimizer with WiFi Load balancing
	GPS (select models only)
	U-Blox GPS EVA-M8M M.2/USB WW, not available with WWAN
	WWAN (select models only)
	<ul style="list-style-type: none"> Huawei HP It4132, LTE/HSPA+ 4G with GPS M.2 Foxconn It4220 LTE/HSPA+ with GPS
	SIM (user-accessible on side (4FF/nano SIM). (SIM module is installed in the factory when a service provider is configured)
	WWAN antennas (2) (worldwide except Japan)
Ports	Slate:

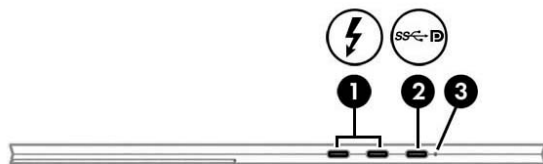
Category	Description
	Audio-out (headphone)/audio-in (microphone) combo jack
	Nano SIM
	(2) USB-C 3.1 port with Thunderbolt (docking, power, USB)
	USB-C 3.1 with GP and PD
	Collaboration Travel Keyboard (select models only):
	Keyboard
	TouchPad
Sensors	Combo chip
	<ul style="list-style-type: none"> Accelerometer
	<ul style="list-style-type: none"> Gyro
	<ul style="list-style-type: none"> Magnetometer
	Ambient light sensor (ALS)
	Proximity (SAR for WWAN)
	Dual accelerometers (in keyboard)
Docking	Hall sensor
	HP Thunderbolt Dock
	HP Thunderbolt Dock with 65W adapter supported
	HP Thunderbolt Dock with 90W adapter supported including Fast Charge
	HP Elite USB-C Docking Station
	BNB Universal Dock
	USB-C 3.1 Port Replicator
Keyboard/pointing devices	External Collaboration Travel Keyboard
	Backlit
	TouchPad requirements
	Microsoft Precision Touchpad Default Gestures Support
	Firmware PTP with Filter Driver
	Hybrid Mode Support
Power requirements	Battery
	4-cell Long Life Polymer 50.05 Whr (3250mAh/cell)
	Supports HP Fast Charge
	AC adapter (USB Type-C, straight):
	65 W non-PFC, wall mount
	Power cord:
	1.0 M length power cord with duckhead



Category	Description
Security	TPM 2.0
	Pad fingerprint reader (select models only)
	Power-on authentication (password, fingerprint)
Operating system	Windows 10 Enterprise 64
	Windows 10 Enterprise 64 LTSB 1607
	Windows 10 Home 64
	Windows 10 Home 64 Chinese Market CPPP
	Windows 10 Home 64 High-End Chinese Market CPPP
	Windows 10 Home 64 Plus
	Windows 10 Home 64 Plus Single Language
	Windows 10 Home 64 Single Language
	Windows 10 Home 64 StF MSNA for Higher Education Strategic
	Windows 10 Pro 64
	Windows 10 Pro 64 StF MSNA Plus
	Windows 10 Pro 64 StF MSNA Standard
	Windows 10 Pro 64 StF MSNA Strategic
Serviceability	End user replaceable parts:
	AC adapter (Slate only)
	Kickstand
	Pen

2 Components

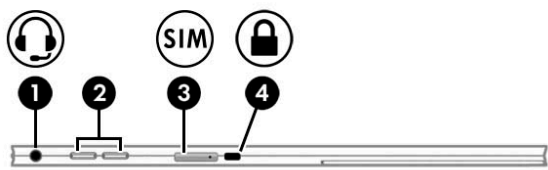
Your computer features top-rated components. This chapter provides details about your components, where they're located, and how they work.



Right



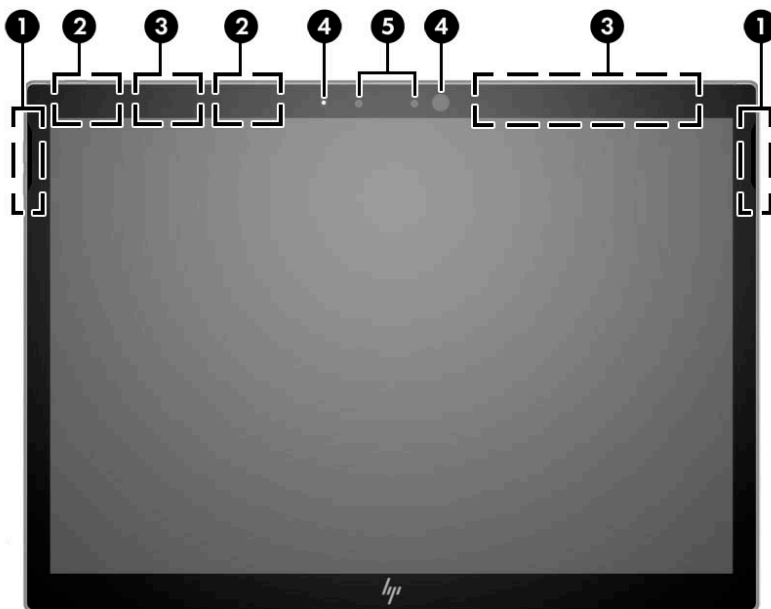
Component	Description
(1) 	<p>USB Type-C power connector and Thunderbolt port with HP Sleep and Charge</p> <p>Connects an AC adapter that has a USB Type-C connector, supplying power to the computer and, if needed, charging the computer battery.</p> <p>– and –</p> <p>Connects and charges most USB devices that have a Type-C connector, such as a cell phone, camera, activity tracker, or smartwatch, and provides high-speed data transfer.</p> <p>– and –</p> <p>Connects a display device that has a USB Type-C connector, providing DisplayPort output.</p> <p>NOTE: Your computer may support a Thunderbolt™ docking station.</p> <p>NOTE: Cables and/or adapters (purchased separately) may be required.</p>
(2) 	<p>USB Type-C SuperSpeed port and DisplayPort</p> <p>When the computer is on, connects and charges most USB devices that have a Type-C connector, such as a cell phone, camera, activity tracker, or smartwatch, and provides high-speed data transfer.</p> <p>NOTE: Cables and/or adapters (purchased separately) may be required.</p> <p>– and –</p> <p>Connects a DisplayPort device that has a USB Type-C connector, providing display output.</p>
(3)	<p>Battery light</p> <p>When AC power is connected:</p> <ul style="list-style-type: none">• White: The battery charge is greater than 90 percent.• Amber: The battery charge is from 0 to 90 percent.• Off: The battery is not charging. <p>When AC power is disconnected (battery not charging):</p> <ul style="list-style-type: none">• Blinking amber: The battery has reached a low battery level. When the battery has reached a critical battery level, the battery light begins blinking rapidly.• Off: The battery is not charging.

Left



Component	Description	
(1) 	Audio-out (headphone)/Audio-in (microphone) combo jack	<p>Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional standalone microphones.</p> <p>WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the <i>Regulatory, Safety, and Environmental Notices</i>.</p> <p>To access this guide:</p> <ul style="list-style-type: none">▲ Select the Start button, select HP Help and Support, and then select HP Documentation.– or –▲ Select the Start button, select HP, and then select HP Documentation. <p>NOTE: When a device is connected to the jack, the computer speakers are disabled.</p>
(2)	Volume buttons	<p>Control speaker volume on the computer.</p> <p>– or –</p> <p>If the keyboard (select products only) is not attached, press both volume buttons to turn on the SureView application.</p>
(3)	SIM card slot (select products only)	<p>Supports a wireless subscriber identity module (SIM) card.</p> <p>For SIM card installation steps, see Nano SIM card on page 32.</p>
(4) 	Security cable slot	<p>Attaches an optional security cable to the computer.</p> <p>NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.</p>

Display



Component		Description
(1)	Speakers	Produce sound.
(2)	WLAN antennas*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(3)	WWAN antennas (select products only) *	Send and receive wireless signals to communicate with wireless wide area networks (WWANs).
(4)	Camera light(s)	On: One or more camera(s) are in use.
(5)	Camera(s) (select products only)	Allow(s) you to video chat, record video, and record still images. Some cameras also allow a facial recognition logon to Windows, instead of a password logon. NOTE: Camera functions vary depending on the camera hardware and software installed on your product.

*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions.

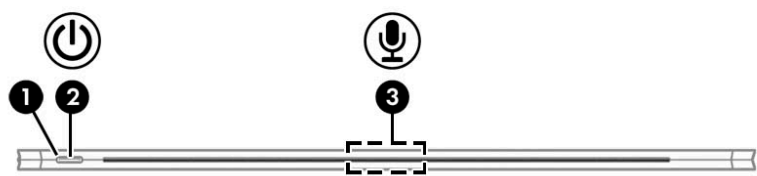
For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region.




To access this guide:

▲ Select the **Start** button, select **HP Help and Support**, and then select **HP Documentation**.

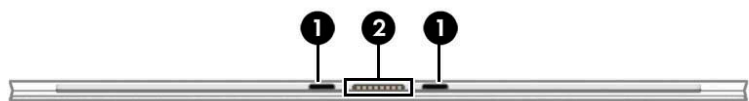
– or –

▲ Select the **Start** button, select **HP**, and then select **HP Documentation**.



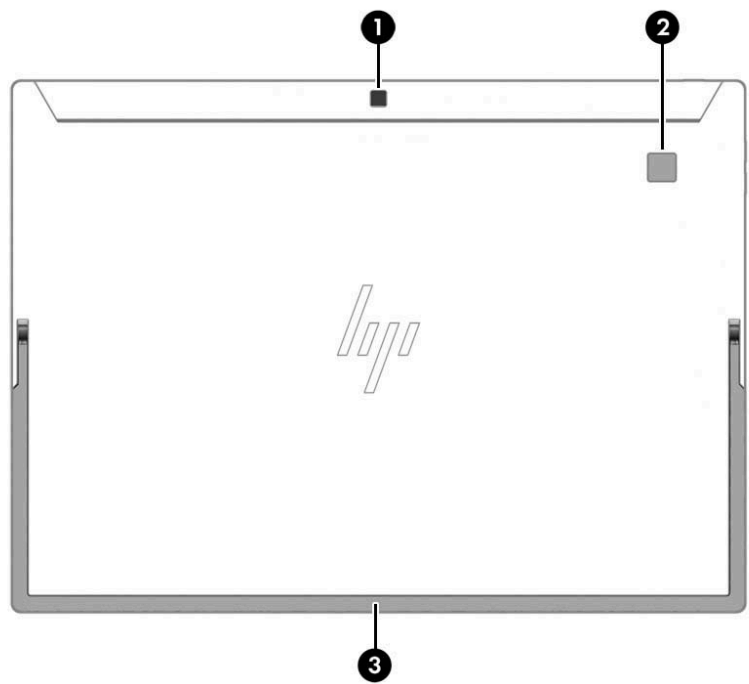
Component		Description
(1)		<div>Power light</div> <ul style="list-style-type: none">On: The computer is on.Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(2)		<div>Power button</div> <ul style="list-style-type: none">When the computer is off, press the button to turn on the computer.When the computer is on, press the button briefly to initiate Sleep.When the computer is in the Sleep state, press the button briefly to exit Sleep.When the computer is in Hibernation, press the button briefly to exit Hibernation. <p>CAUTION: Pressing and holding down the power button results in the loss of unsaved information.</p> <p>If the computer has stopped responding and shutdown procedures are ineffective, press and hold the power button down for at least 5 seconds to turn off the computer.</p> <p>To learn more about your power settings, see your power options:</p> <p>▲ Right-click the Power icon , and then select Power Options.</p>
(3)		<div>Internal microphones</div> <div>Record sound.</div>

Bottom



Component		Description
(1)	Alignment post connectors (2)	Connect to the alignment posts on the keyboard (select products only).
(2)	Keyboard connector	Connects the computer to the keyboard (select products only).

Rear

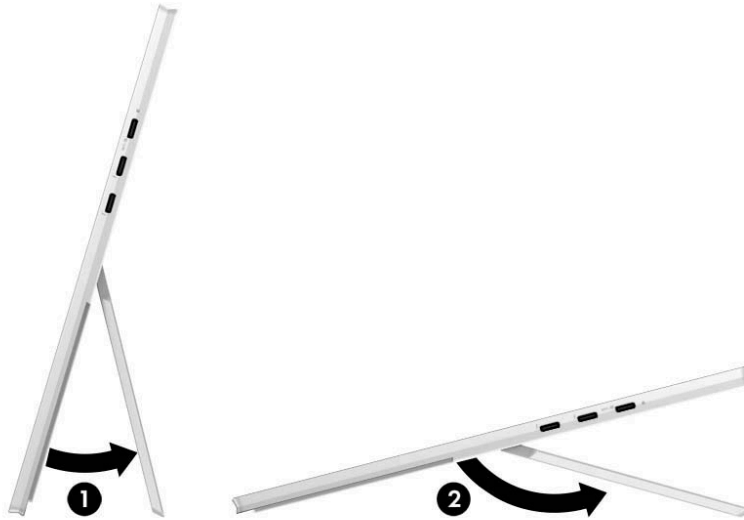


Component		Description
(1)	Rear camera	Allows you to video chat, record video, and record still images.
(2)	Fingerprint reader (select products only)	Allows a fingerprint logon to Windows, instead of a password logon.
(3)	Kickstand	Provides stability and a variety of viewing angles.

Using the kickstand

To change the angle for the display, follow these steps:

1. Hold the tablet with top edge up (the speakers are on top).
2. Slide the kickstand away from the tablet and position the kickstand at the desired angle. The kickstand will hold at a midway point **(1)** of about 52 degrees or at full stopping point **(2)** of about 118 degrees.



To close the kickstand, push the kickstand against the bottom of the tablet until it is flush with the bottom.



Keyboard area (select products only)

Connecting the keyboard

- ▲ To connect the keyboard, lower the computer onto the keyboard until the connectors click into place.

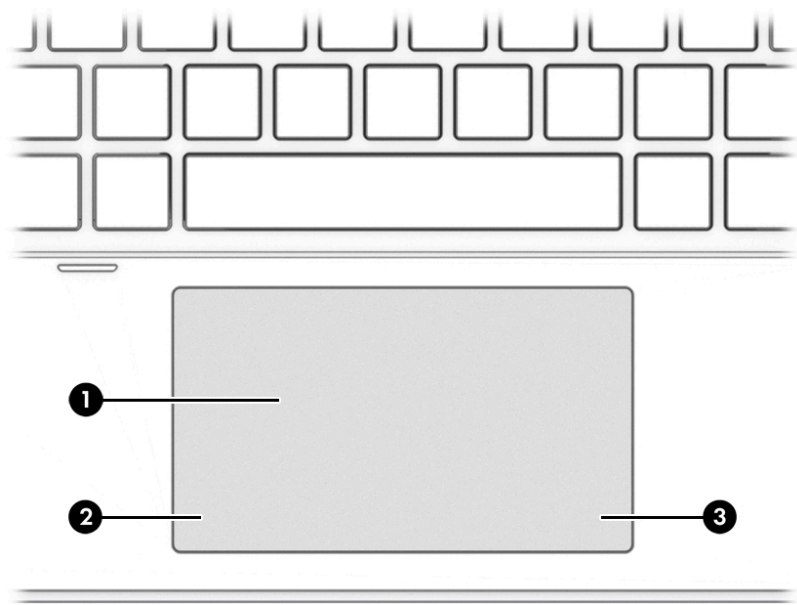


Removing the keyboard

- ▲ To remove the computer from the keyboard, pull the computer away from the back of the keyboard.

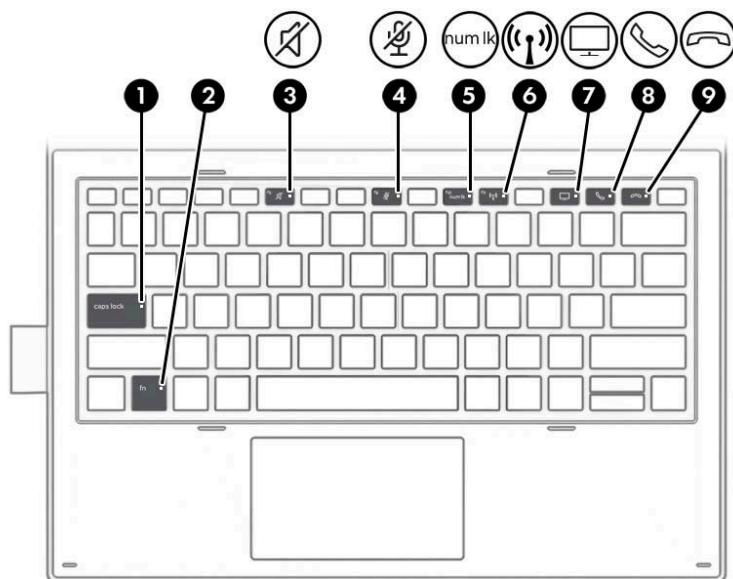









TouchPad



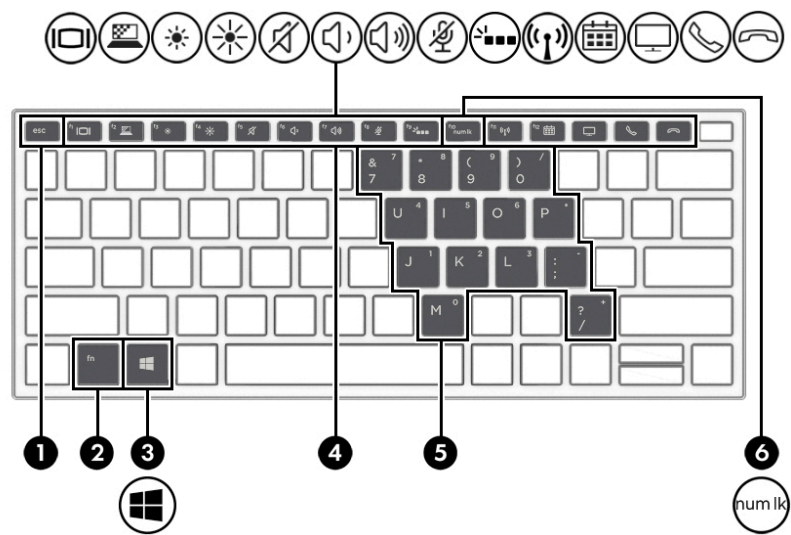
Component		Description
(1)	TouchPad zone	Reads your finger gestures to move the pointer or activate items on the screen.
(2)	Left TouchPad button	Functions like the left button on an external mouse.
(3)	Right TouchPad button	Functions like the right button on an external mouse.


Lights



Component		Description
(1)	Caps lock light	On: Caps lock is on, which switches the key input to all capital letters.
(2)	Fn lock light	On: The fn key is locked.
(3)	 Mute light	<ul style="list-style-type: none"> On: Computer sound is off. Off: Computer sound is on.
(4)	 Microphone mute light	<ul style="list-style-type: none"> On: Microphone is off. Off: Microphone is on.
(5)	 Num lk light	On: Num lock is on.
(6)	 Wireless light	<p>On: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on.</p> <p>NOTE: On some models, the wireless light is amber when all wireless devices are off.</p>
(7)	 Sharing or presenting light	On: Sharing is on.
(8)	 Call answer light	On: Call answer is on.
(9)	 Call end light	On: Call end is on.

Special keys


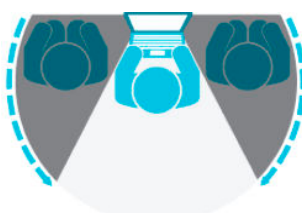















Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with another key. Such key combinations are called <i>hot keys</i> .
(3)	 Windows key	Opens the Start menu. NOTE: Pressing the Windows key again will close the Start menu.
(4)	Action keys	Execute frequently used system functions. See Action keys on page 15 .
(5)	Embedded numeric keypad	A numeric keypad superimposed over the keyboard alphabet keys. When num lk is pressed, the keypad can be used like an external numeric keypad. Each key on the keypad performs the function indicated by the icon in the upper-right corner of the key. NOTE: If the keypad function is active when the computer is turned off, that function is reinstated when the computer is turned back on.
(6)	num lk key	Turns the embedded numeric keypad on and off.

Action keys

An action key performs the function indicated by the icon on the key. To determine which keys are on your product, see [Special keys on page 14](#).

▲ To use an action key, press and hold the key.

Icon	Description
	<p>Helps prevent side-angle viewing from onlookers. If needed, decrease or increase brightness for well-lit or darker environments. Press the key again to turn off the privacy screen (select products only).</p> <p>NOTE: To quickly turn on the highest privacy setting, press fn+p.</p> <p>– or –</p> <p>If the keyboard (select products only) is not attached, press both volume buttons to turn on the SureView application.</p> 
	Decreases the screen brightness incrementally as long as you hold down the key.
	Increases the screen brightness incrementally as long as you hold down the key.
	<p>Turns the keyboard backlight off or on.</p> <p>NOTE: To conserve battery power, turn off this feature.</p>
	Decreases speaker volume incrementally while you hold down the key.
	Increases speaker volume incrementally while you hold down the key.
	Mutes the microphone.
	Mutes or restores speaker sound.
	<p>Turns the wireless feature on or off.</p> <p>NOTE: A wireless network must be set up before a wireless connection is possible.</p>
	Switches the screen image among display devices connected to the system. For example, if a monitor is connected to the computer, repeatedly pressing the key alternates the screen image from computer display to monitor display to simultaneous display on both the computer and the monitor.
	<p>Provides quick access to your Skype for Business calendar.</p> <p>NOTE: This feature requires Skype® for Business or Lync® 2013 running on Microsoft Exchange or Office 365® servers.</p>


Icon	Description
	<p>Turns the screen sharing function on or off.</p> <p>NOTE: This feature requires Skype for Business or Lync 2013 running on Microsoft Exchange or Office 365 servers.</p>
	<ul style="list-style-type: none"> • Answers a call. • Starts a call during a 1-on-1 chat. • Places a call on hold. <p>NOTE: This feature requires Skype for Business or Lync 2013 running on Microsoft Exchange or Office 365 servers.</p>
	<ul style="list-style-type: none"> • Ends a call. • Declines incoming calls. • Ends screen sharing. <p>NOTE: This feature requires Skype for Business or Lync 2013 running on Microsoft Exchange or Office 365 servers.</p>



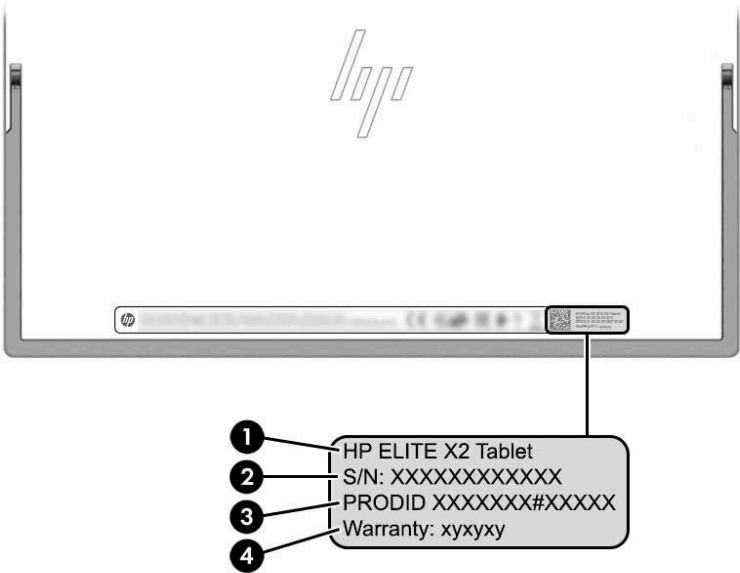
NOTE: The action key feature is enabled at the factory. You can disable this feature by pressing and holding the **fn** key and the left **shift** key. The fn lock light will turn on. After you have disabled the action key feature, you can still perform each function by pressing the **fn** key in combination with the appropriate action key.

Labels

The labels affixed to the computer provide information you may need when you troubleshoot system problems or travel internationally with the computer. Labels may be in paper form or imprinted on the product.

 **IMPORTANT:** Check the following locations for the labels described in this section: the bottom of the computer, inside the battery bay, under the service door, on the back of the display, or on the bottom of a tablet kickstand.

- **Service label**—Provides important information to identify your computer. When contacting support, you may be asked for the serial number, the product number, or the model number. Locate this information before you contact support.




Component	
(1)	HP product name
(2)	Serial number
(3)	Product ID
(4)	Warranty period

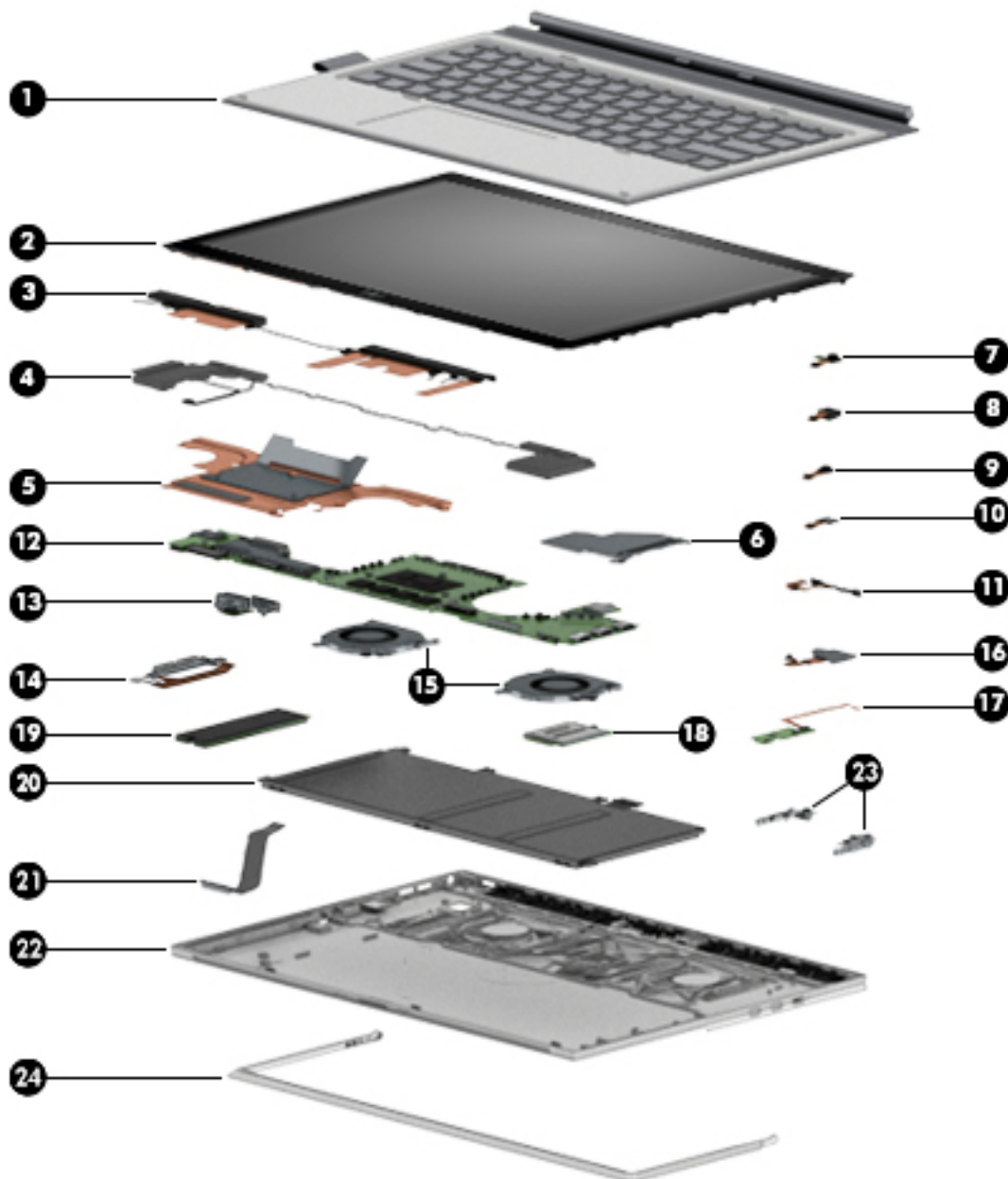
- **Regulatory label(s)**—Provide(s) regulatory information about the computer.
- **Wireless certification label(s)**—Provide(s) information about optional wireless devices and the approval markings for the countries or regions in which the devices have been approved for use.

3 Illustrated parts catalog

Computer major components

 **NOTE:** HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to <http://partsurfer.hp.com>, select your country or region, and then follow the on-screen instructions.

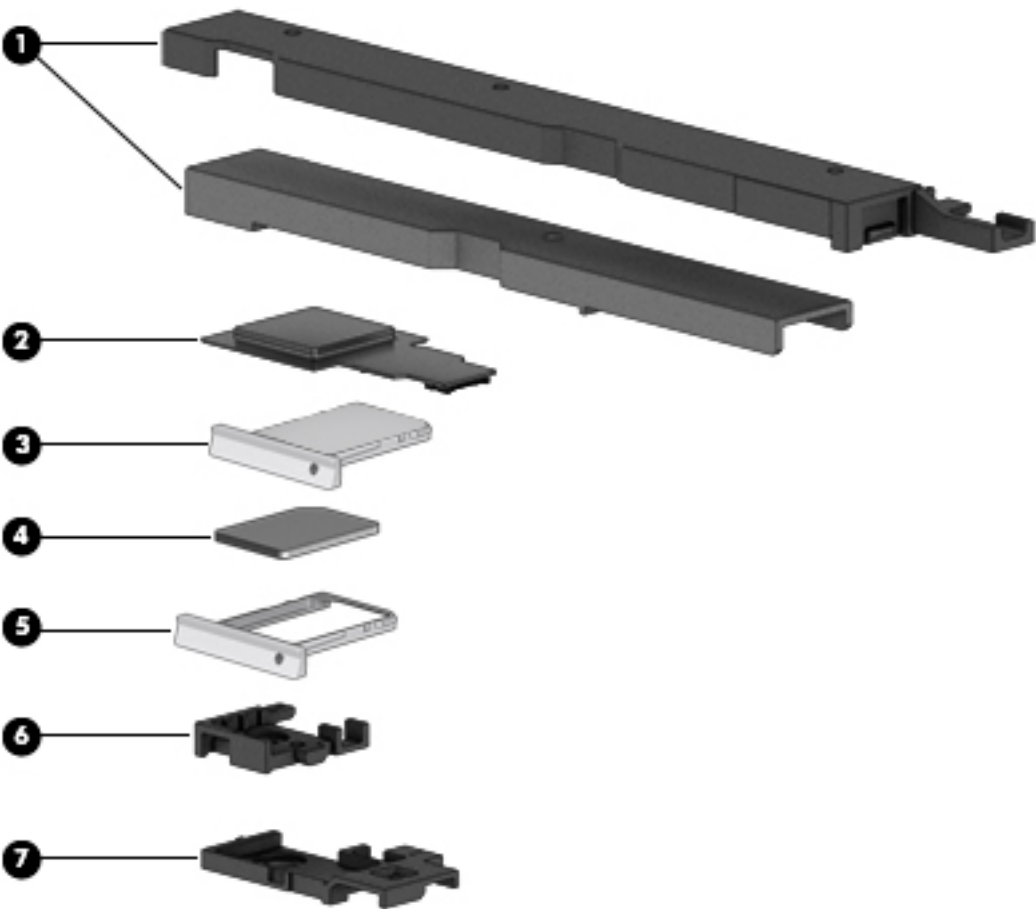
 **NOTE:** Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See [Labels on page 17](#) for details.



Item	Component	Spare part number
(1)	Collaboration Travel Keyboard For a list of keyboard country codes, see Miscellaneous parts on page 22 .	L29965-001
(2)	Display panel	
	WUXGA+, privacy (includes privacy panel, touch board, IR bezel, LCD cable, and touch control cable)	L31364-001
	3k2k, models without an IR camera (includes panel, touch board, bezel, LCD cable, and touch control cable)	L31365-001
	3k2k, models with an IR camera (includes panel, touch board, IR bezel, LCD cable, and touch control cable)	L31886-001
(3)	WWAN and WLAN antennas and cables (see Antennas on page 55)	L31347-001
(4)	Speaker Kit	L31353-001
(5)	Heat sink	L31354-001
(6)	USB bracket (includes AL foil)	L31356-001
(7)	Front-facing HD camera	L31348-001
(8)	Rear-facing camera	L31349-001
(9)	IR camera	L31350-001
(10)	IR LED module	L31350-001
(11)	Microphone board (includes ambient light sensor)	L31344-001
(12)	System board (includes integrated processor) (see System board on page 51)	
	Intel Core i7-8650U processor and 16 GB of system memory	L31341-601
	Intel Core i7-8650U processor and 8 GB of system memory	L31978-601
	Intel Core i7-8550U processor and 16 GB of system memory	L33481-601
	Intel Core i7-8550U processor and 8 GB of system memory	L31977-601
	Intel Core i5-8350U processor and 16 GB of system memory	L31339-601
	Intel Core i5-8350U processor and 8 GB of system memory	L31337-601
	Intel Core i5-8250U processor and 16 GB of system memory	L31335-601
	Intel Core i5-8250U processor and 8 GB of system memory	L31333-601
	Intel Core i3-8130U processor and 8 GB of system memory	L31331-601
(13)	Volume board	L35962-001
(14)	Power button board with audio jack cable	L35963-001
(15)	Fan Kit	L31355-001
(16)	Fingerprint reader	L31352-001
(17)	Hall sensor board (includes cable)	L31343-001
(18)	WWAN module	
	Huawei ME906S LTE HSPA+	L29293-005

Item	Component	Spare part number
	Qualcomm Snapdragon X12 LTE-Advanced	L29295-005
(19)	Solid-state drive (M.2) (see Solid-state drive on page 38)	
	1 TB, PCIe, TLC	L31368-001
	512 GB, PCIe, self-encrypting drive (SED), Opal 2, TLC	L31366-001
	512 GB, PCIe, TLC	L31372-001
	256 GB, PCIe, self-encrypting drive (SED), Opal 2, TLC	L31369-001
	256 GB, PCIe, TLC	L31370-001
	256 GB, PCIe	L31371-001
	128 GB, SATA-3, TLC	L31367-001
(20)	Battery, 4 cell, 50 Wh	937434-855
(21)	POGO connector and cable	L31359-001
(22)	Back cover	
	For use in models without WWAN	L31357-001
	For use in models with WWAN	L31358-001
(23)	Kickstand hinges (included with back cover)	L31376-001
(24)	Kickstand	L31377-001

Plastics Kit



Item	Component	Spare part number
Plastics Kit		L31374-001
(1)	Antenna holder insert	
(2)	Fingerprint reader insert	
(3)	SIM tray	
(4)	SIM insert	
(5)	SIM tray insert	
(6)	IR camera bezel	
(7)	HD camera bezel	
WWAN gasket, IR LED tape, USB bracket foil, speaker gasket, thermal long/short gasket, power button, volume button (not illustrated)		

Miscellaneous parts

Component	Spare part number
AC adapter	
120 W, PFC, 7.4 mm	932446-850
90 W, PFC, S-3P, 4.5 mm	710413-001
65 W, nPFC, USB-C, slim, straight, 1.8 m	L04650-850
65 W, nPFC, RC, USB-C, 3 pin	860209-850
Docks	
HP Thunderbolt Dock 120W (with cable)	L15809-001
HP Thunderbolt Dock 230W (with cable)	L24855-001
HP Thunderbolt 3 Dock	849784-001
HP USB-C Universal Dock	935326-001
HP USB-C Dock G4	L16133-001
HP USB-C Mini Dock	935327-001
HP Active Pen with App Launch	L16131-001
SIM cable	L31345-001
Adapters	
HP USB-C to USB 3.0 Adapter	814618-001
HP USB-C to VGA Adapter	831751-001
HP USB-C to DisplayPort Adapter	831753-001
HP USB-C to RJ-45 Adapter	918779-001
HP USB-C to HDMI 2.0 Adapter	935325-001
HP USB-C Travel Hub	919418-001
HP Nano Lock	918431-001
HP Wacom Tweezer	L04642-001
Rubber Kit	928645-001
Screw Kit	L31362-001
Collaboration Travel Keyboard	
For use in Belgium	L29965-A41
For use in Brazil	L29965-201
For use in Bulgaria	L29965-261
For use in Canada	L29965-DB1
For use in the Czech Republic and Slovakia	L29965-FL1
For use in Denmark	L29965-081
For use in France	L29965-051

Component	Spare part number
For use in Germany	L29965-041
For use in Greece	L29965-151
For use in Hungary	L29965-211
For use in Iceland	L29965-DD1
For use in India	L29965-D61
For use internationally	L29965-B31
For use in Israel	L29965-BB1
For use in Italy	L29965-061
For use in Japan	L29965-291
For use in Latin America	L29965-161
For use in The Netherlands	L29965-DH1
For use in Northwest Africa	L29965-FP1
For use in Norway	L29965-091
For use in Portugal	L29965-131
For use in Romania	L29965-271
For use in Russia	L29965-251
For use in Saudi Arabia	L29965-171
For use in Slovenia	L29965-BA1
For use in South Korea	L29965-AD1
For use in Spain	L29965-071
For use in Sweden and Finland	L29965-B71
For use in Switzerland	L29965-BG1
For use in Taiwan	L29965-AB1
For use in Thailand	L29965-281
For use in Turkey	L29965-141
For use in the United Kingdom and Singapore	L29965-031
For use in the United States	L29965-001
Power cord (C5, 1.0 m)	
For use in Argentina	L19339-001
For use in Australia	L19340-001
For use in Brazil	L19341-001
For use in Denmark	L19342-001
For use in Europe	L19343-001
For use in India	L19345-001

Component	Spare part number
For use in Israel	L19344-001
For use in Italy	L19346-001
For use in North America	L19348-001
For use in the People's Republic of China	L19349-001
For use in South Africa	L19350-001
For use in Taiwan	L19353-001
For use in Switzerland	L19351-001
For use in Thailand	L19352-001
For use in the United Kingdom and Singapore	L19354-001
Duck head power cord for use in the United States	L27467-001
Duck head power cord for use in Europe and South Korea	L31375-001

4 Removal and replacement procedures preliminary requirements


Tools required

You will need the following tools to complete the removal and replacement procedures:


- Magnetic screwdriver
- Phillips PH Type #0 and #1 screwdrivers
- Torx T5 screwdriver
- Non-marking, non-magnetic pry tool
- Suction cup tool

Service considerations


The following sections include some of the considerations that you must keep in mind during disassembly and assembly procedures.

 **NOTE:** As you remove each subassembly from the computer, place the subassembly (and all accompanying screws) away from the work area to prevent damage.

Plastic parts

 **CAUTION:** Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic

Cables and connectors

 **CAUTION:** When servicing the computer, be sure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the computer.

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Be sure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

Electrostatic discharge damage

Electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. Networks built into many integrated circuits provide some protection, but in many cases, ESD contains enough power to alter device parameters or melt silicon junctions.

A discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Even if the spark is neither felt nor heard, damage may have occurred.

An electronic device exposed to ESD may not be affected at all and can work perfectly throughout a normal cycle. Or the device may function normally for a while, then degrade in the internal layers, reducing its life expectancy.

⚠ CAUTION: To prevent damage to the tablet when you are removing or installing internal components, observe these precautions:

Keep components in their electrostatic-safe containers until you are ready to install them.

Before touching an electronic component, discharge static electricity by using the guidelines described in this section.

Avoid touching pins, leads, and circuitry. Handle electronic components as little as possible.

If you remove a component, place it in an electrostatic-safe container.

The following table shows how humidity affects the electrostatic voltage levels generated by different activities.

⚠ CAUTION: A product can be degraded by as little as 700 V.

Typical electrostatic voltage levels			
Event	Relative humidity		
	10%	40%	55%
Walking across carpet	35,000 V	15,000 V	7,500 V
Walking across vinyl floor	12,000 V	5,000 V	3,000 V
Motions of bench worker	6,000 V	800 V	400 V
Removing DIPS from plastic tube	2,000 V	700 V	400 V
Removing DIPS from vinyl tray	11,500 V	4,000 V	2,000 V
Removing DIPS from Styrofoam	14,500 V	5,000 V	3,500 V
Removing bubble pack from PCB	26,500 V	20,000 V	7,000 V
Packing PCBs in foam-lined box	21,000 V	11,000 V	5,000 V

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.
- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep ESD-sensitive parts in their containers until the parts arrive at static-free workstations.
- Place items on a grounded surface before removing items from their containers.
- Always be properly grounded when touching a component or assembly.
- Store reusable ESD-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screw drivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

Equipment guidelines

Grounding equipment must include either a wrist strap or a foot strap at a grounded workstation.

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm $\pm 10\%$ resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.
- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive must be worn in contact with the skin.


The following grounding equipment is recommended to prevent electrostatic damage:

- Antistatic tape
- Antistatic smocks, aprons, and sleeve protectors
- Conductive bins and other assembly or soldering aids
- Nonconductive foam
- Conductive tabletop workstations with ground cords of one megohm resistance
- Static-dissipative tables or floor mats with hard ties to the ground
- Field service kits
- Static awareness labels
- Material-handling packages
- Nonconductive plastic bags, tubes, or boxes
- Metal tote boxes
- Electrostatic voltage levels and protective materials

The following table lists the shielding protection provided by antistatic bags and floor mats.

Material	Use	Voltage protection level
Antistatic plastics	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	5,000 V


5 Removal and replacement procedures for Customer Self-Repair parts

 **NOTE:** The Customer Self-Repair program is not available in all locations. Installing a part not supported by the Customer Self-Repair program may void your warranty. Check your warranty to determine if Customer Self-Repair is supported in your location.

 **NOTE:** HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to <http://partsurfer.hp.com>, select your country or region, and then follow the on-screen instructions.

Component replacement procedures

 **NOTE:** Please read and follow the procedures described here to access and replace Customer Self-Repair parts successfully.

 **NOTE:** Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag on the bottom of your computer. See [Labels on page 17](#) for details.

This chapter provides removal and replacement procedures for Customer Self-Repair parts.

Kickstand

Description	
Kickstand	L31377-001

 **IMPORTANT:** Make special note of each screw size and location during removal and replacement.

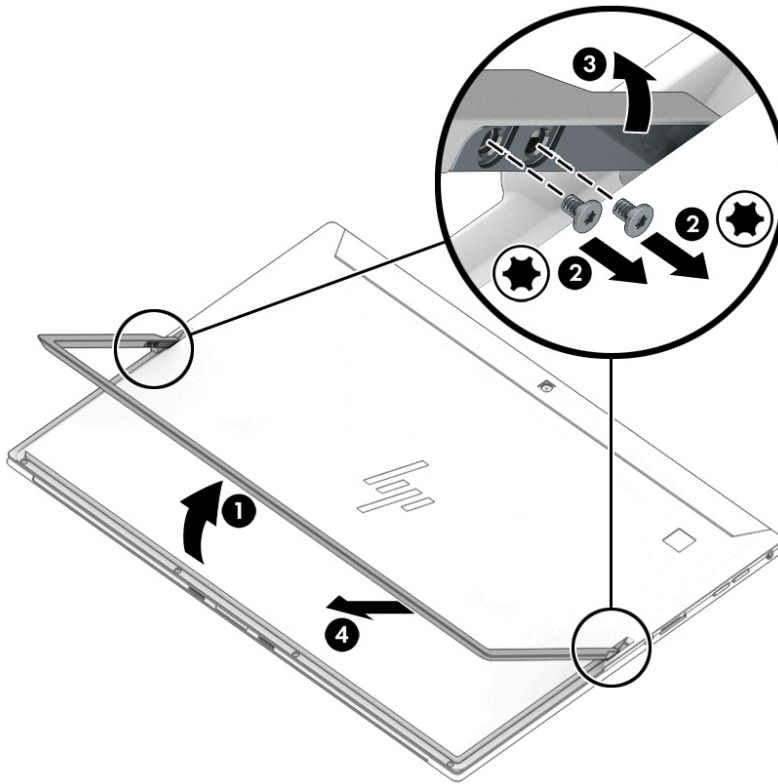
Before removing the kickstand, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.

Remove the kickstand:

1. Lift the kickstand **(1)**.
2. Remove two Torx T5 1.6×2.5 screws from each side of the kickstand **(2)**.


3. Pull the sides of the kickstand away from the computer **(3)**, and then remove the kickstand **(4)**.



Reverse this procedure to replace the kickstand.


6 Removal and replacement procedures for Authorized Service Provider parts

This chapter provides removal and replacement procedures for Authorized Service Provider only parts.

 **CAUTION:** Components described in this chapter should only be accessed by an authorized service provider. Accessing these parts can damage the computer or void the warranty.

CAUTION: This computer does not have user-replaceable parts. Only HP authorized service providers should perform the removal and replacement procedures described here. Accessing the internal part could damage the computer or void the warranty.

Component replacement procedures

 **NOTE:** Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See [Labels on page 17](#) for details.

 **NOTE:** HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to <http://partsurfer.hp.com>, select your country or region, and then follow the on-screen instructions.

There are as many as 42 screws that must be removed, replaced, and/or loosened when servicing Authorized Service Provider only parts. Make special note of each screw size and location during removal and replacement.

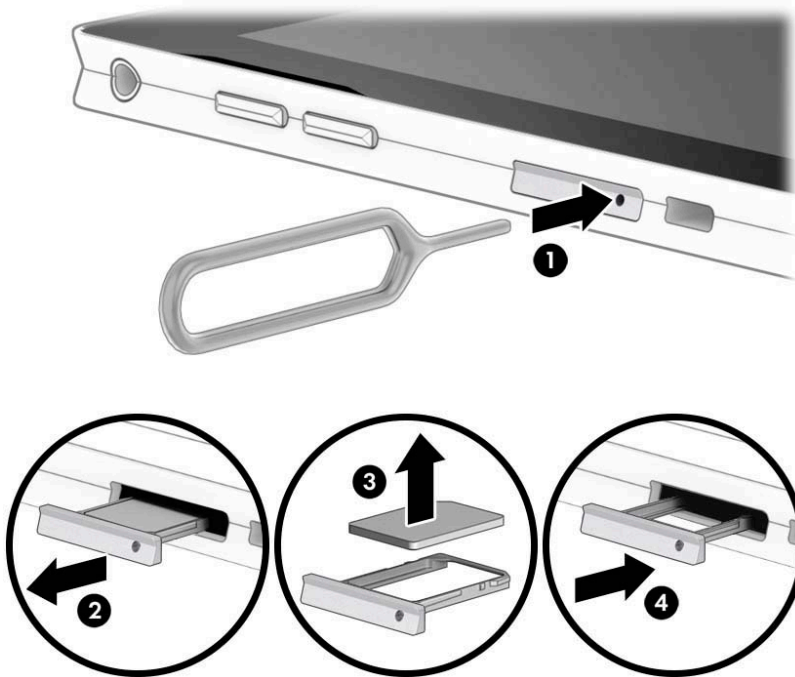
Nano SIM card

CAUTION: To prevent damage to the connectors, use minimal force when inserting a nano SIM card.

CAUTION: To prevent damage to a SIM card or a computer, do not change the size of a SIM card by cutting or sanding the card.

NOTE: SIM blank does not have hole and should be removed when the system board is removed.

1. Position the computer display-side up on a flat surface.
2. Insert the removal tool or a small straightened paper clip into the card tray access hole until the card tray is ejected (1).
3. Remove the tray (2) from the computer and remove the card (3).
4. Replace the tray in the computer, and then press in gently on the tray (4) until it is firmly seated.



To install a SIM card, reverse the steps.

Display panel

Display panel	Spare part number
Back cover for use in models without WWAN	L31357-001
Back cover for use in models with WWAN	L31358-001
Display panel, WUXGA+, privacy (includes privacy panel, touch board, IR bezel, LCD cable, and touch control cable)	L31364-001
Display panel, 3k2k, models without an IR camera (includes panel, touch board, bezel, LCD cable, and touch control cable)	L31365-001
Display panel, 3k2k, models with an IR camera (includes panel, touch board, IR bezel, LCD cable, and touch control cable)	L31886-001



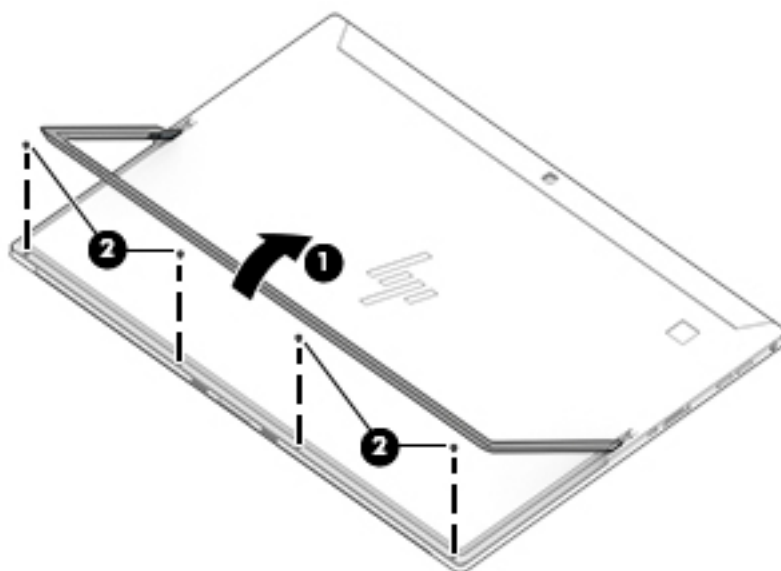
IMPORTANT: Make special note of each screw size and location during removal and replacement.

Before removing the display panel, follow these steps:

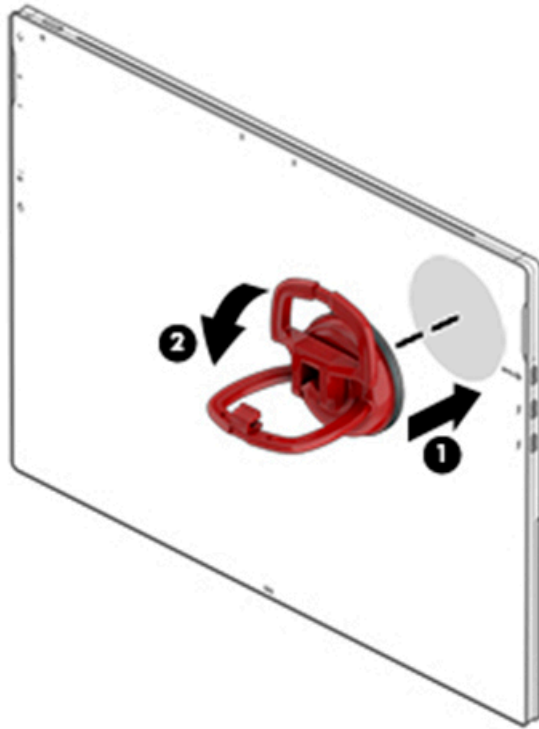
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.

Remove the display panel:

1. Lift the kickstand (1), and then remove the four Torx T5 1.6×2.5 screws (2) securing the back cover.



2. Position a suction tool at the top corner of the display panel **(1)**, and then rotate the locking lever down to lock the cup **(2)**.



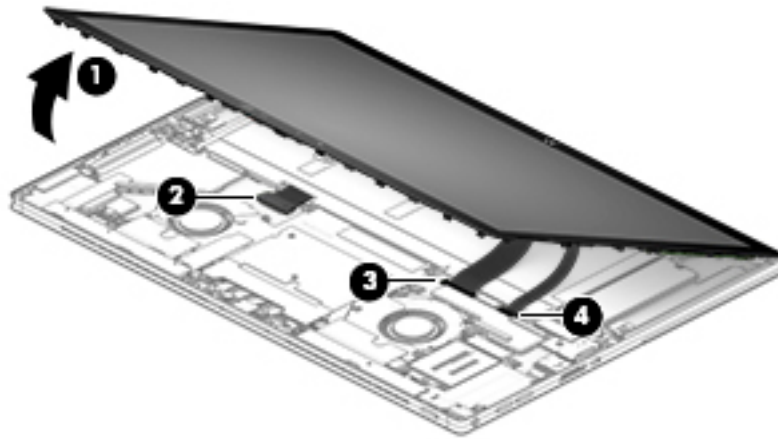
3. Pull the suction tool handle to disengage the panel from the computer.



4. Lift the panel **(1)**, and then disconnect the battery cable **(2)**, display cable **(3)**, and touch cable **(4)** from the system board.



IMPORTANT: Be careful when opening to avoid tearing cables. Be sure to open from the top.



Reverse this procedure to replace the display panel.

Battery


Description	Spare part number
Battery (4 cell, 50 Wh)	937434-855

 **IMPORTANT:** Make special note of each screw size and location during removal and replacement.


Before removing the battery, follow these steps:

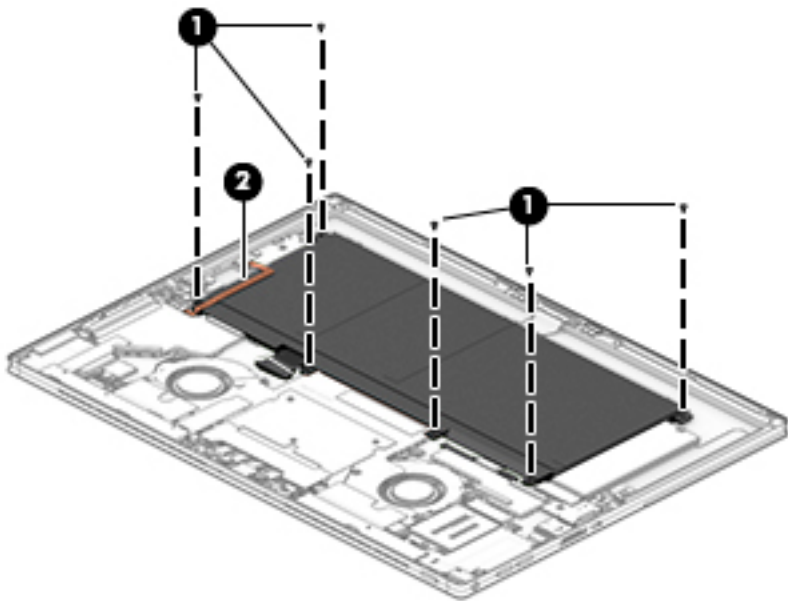
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - ▲ Display panel (see [Display panel on page 33](#))

Remove the battery:

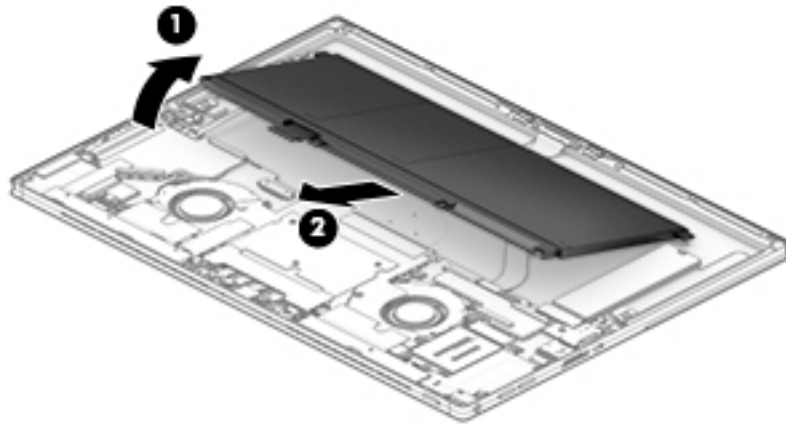
 **WARNING!** To avoid personal injury and damage to the product, use extreme care not to puncture, twist, or crack the battery. A puncture or rupture of the battery internally can cause a short with the battery bursting into flames.

1. Remove the six Phillips M1.6×3.0 screws (1).

 **NOTE:** The hall sensor board cable (2) is adhered to the battery. Remove the cable from the battery before removing the battery. You do not have to disconnect the cable.



2. Carefully rotate the top of the battery up **(1)**, and then lift the battery out of the computer **(2)**.



Reverse this procedure to replace the battery.

Solid-state drive

Description	Spare part number
1 TB, PCIe, TLC	L31368-001
512 GB, PCIe, self-encrypting drive (SED), Opal 2, TLC	L31366-001
512 GB, PCIe, TLC	L31372-001
256 GB, PCIe, self-encrypting drive (SED), Opal 2, TLC	L31369-001
256 GB, PCIe, TLC	L31370-001
256 GB, PCIe	L31371-001
128 GB, SATA-3, TLC	L31367-001

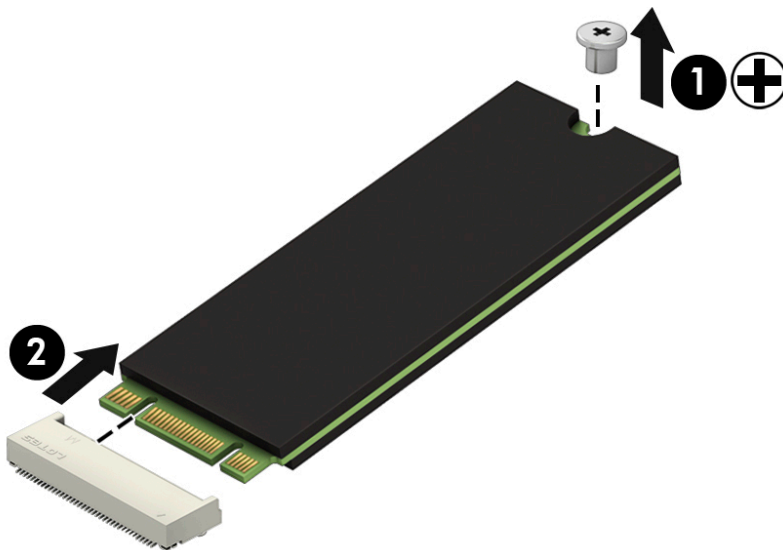
Before removing the solid-state drive, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Disconnect the battery cable (see [Battery on page 36](#))

Remove the solid-state drive:

- ▲ Using a PH Type #0 Phillips screwdriver, remove the Phillips M1.6x1.6 screw **(1)**, and then remove the solid-state drive **(2)**.

 **IMPORTANT:** Be sure to use the correct size screwdriver to avoid stripping the screw.



Reverse this procedure to replace the solid-state drive.

Hall sensor board

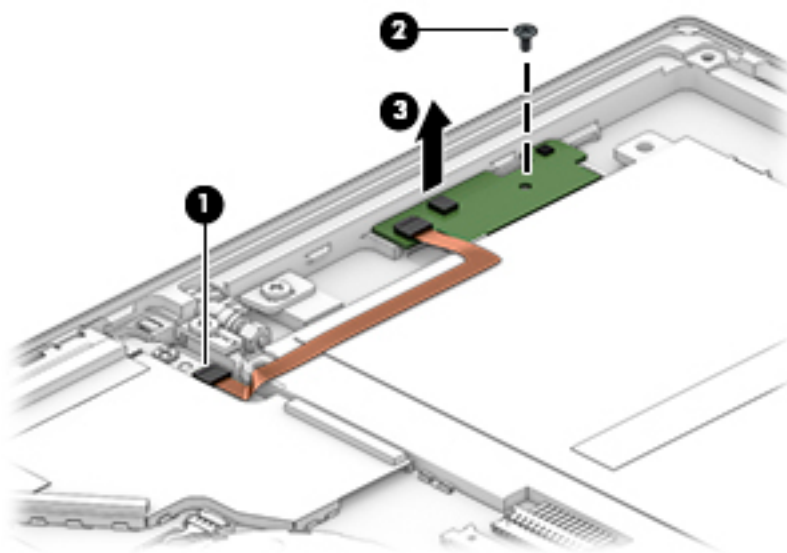
Description	Spare part number
Hall sensor board (includes cable)	L31343-001

Before removing the hall effects sensor board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Disconnect the battery cable (see [Battery on page 36](#))

Remove the hall sensor board:

1. Disconnect the cable from the ZIF connector on the system board **(1)**.
2. Remove the Phillips M1.6×3.0 screw **(2)** securing the board.
3. Remove the board from the computer **(3)**.



Reverse this procedure to replace the hall sensor board.

Kickstand hinges

Description	
Kickstand hinges	L31376-001



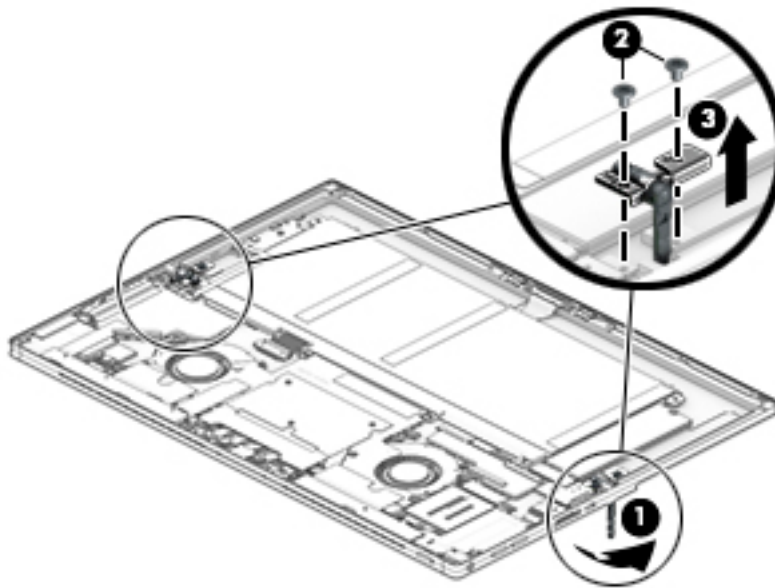
IMPORTANT: Make special note of each screw size and location during removal and replacement.

Before removing the kickstand hinges, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Kickstand (see [Kickstand on page 29](#))
 - b. Display panel (see [Display panel on page 33](#))

Remove the kickstand hinges:

1. From the bottom, rotate the hinges up **(1)**.
2. Remove the two Phillips M2.0×3.0 screws from each kickstand hinge **(2)**, and then remove the hinges **(3)**. Pull the hinges through the holes in the chassis to remove them.



Reverse this procedure to replace the kickstand hinges.

WWAN module (select products only)

Description	Spare part number
Huawei ME906S LTE HSPA+	L29293-005
Qualcomm Snapdragon X12 LTE-Advanced	L29295-005

Before removing the WWAN module, follow these steps:

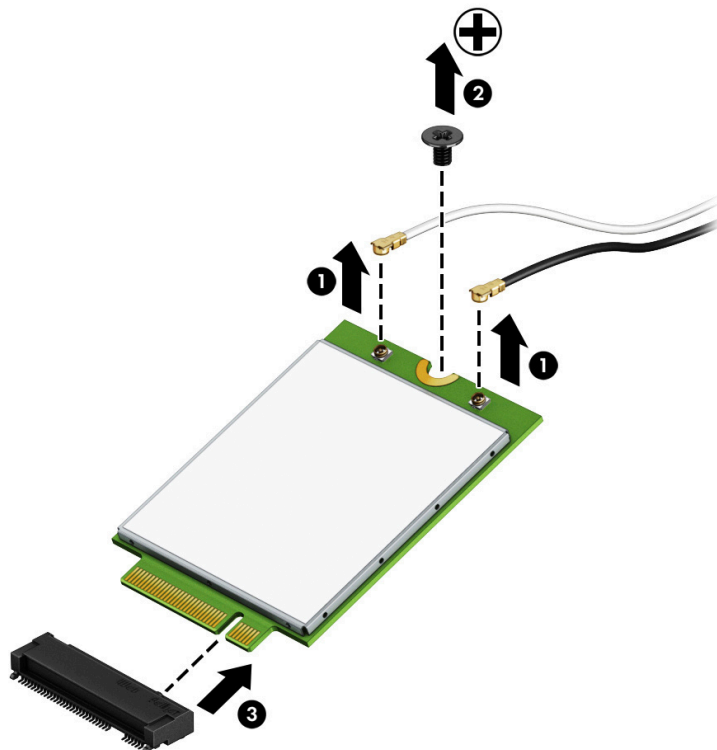
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Disconnect the battery (see [Battery on page 36](#))


Remove the WWAN module:

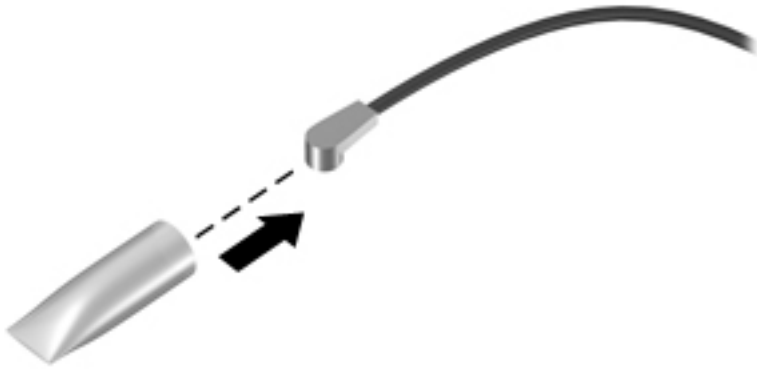
1. Disconnect the antenna cables (1).
2. Using a PH Type #0 Phillips screwdriver, remove the Phillips M2.0×2.0 screw (2), and then remove the module (3).



IMPORTANT: Be sure to use the correct size screwdriver to avoid stripping the screw.



 **NOTE:** If the antenna cables are not connected to the terminals on the module, protective sleeves should be installed on the antenna connectors, as shown in the following illustration.



Reverse this procedure to replace the WWAN module.

POGO connector

Description	Spare part number
POGO connector and cable	L31359-001

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Battery (see [Battery on page 36](#))

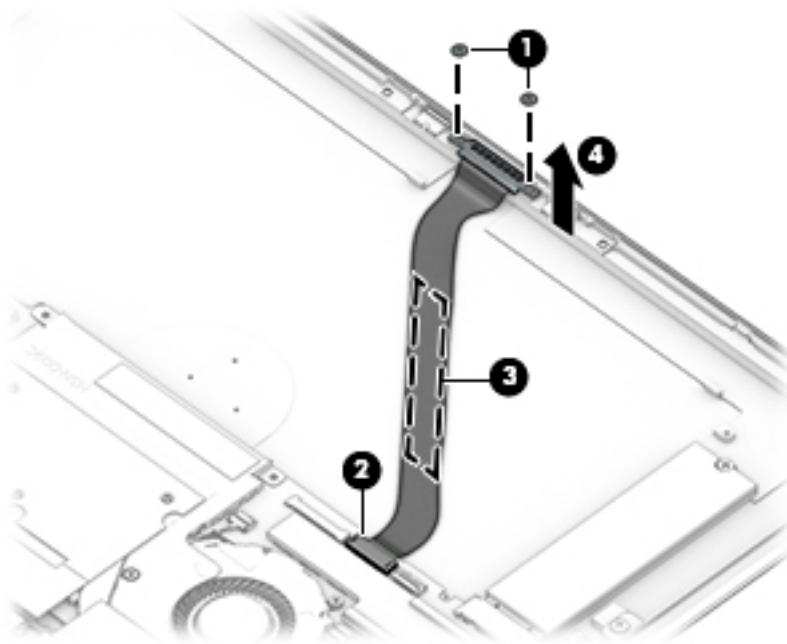
Remove the POGO connector:

1. Using a PH Type #0 Phillips screwdriver, remove the two Phillips M1.6×1.6 screws (1).



IMPORTANT: Be sure to use the correct size screwdriver to avoid stripping the screw.

2. Disconnect the POGO cable from the ZIF connector on the system board (2).
3. Peel the cable up to disengage the adhesive that secures it to the computer (3), and then remove the cable/connector from the computer (4).



Reverse this procedure to replace the POGO connector.

Camera connector bracket

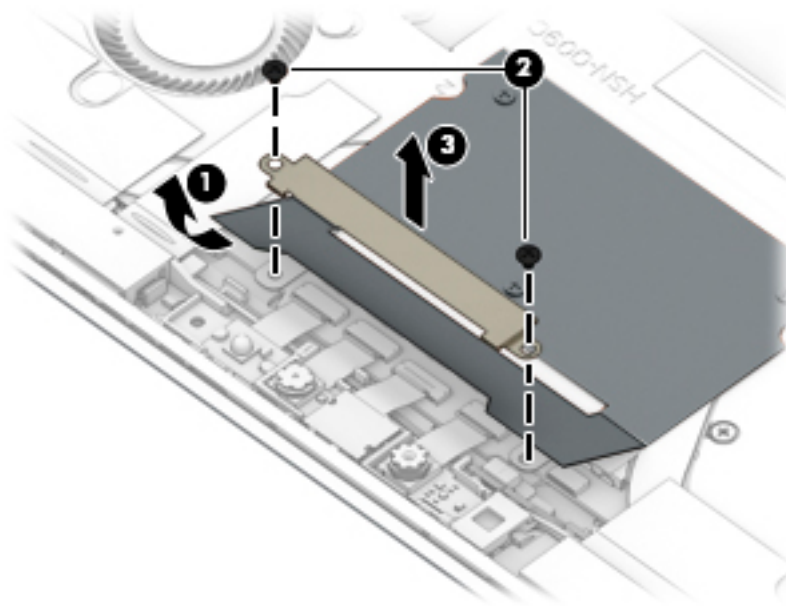
Before removing the camera connector bracket, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Disconnect the battery cable (see [Battery on page 36](#))

Remove the camera connector bracket:

CAUTION: Use care to prevent damaging the zero-insertion force (ZIF) connector and ribbon cable.

1. Pull back the silver Mylar to access the bracket **(1)**.
2. Remove the two Phillips 1.6×2.0 screws **(2)**, and then lift the bracket out of the computer **(3)**.



Reverse this procedure to replace the camera connector bracket.

IR camera

Description	Spare part number
IR camera	L31350-001
IR camera bezel	L31374-001 (Plastics Kit)

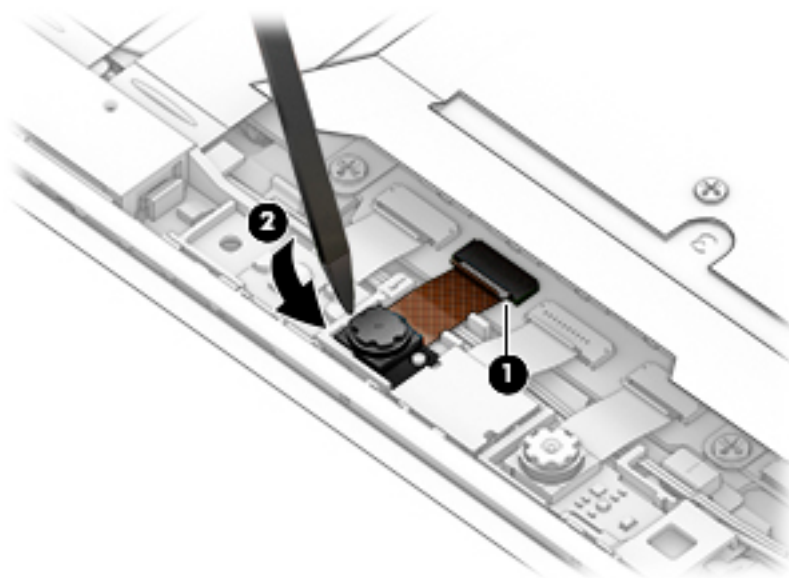
Before removing the IR camera, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Disconnect the battery cable (see [Battery on page 36](#))
 - c. Remove the camera connector bracket (see [Camera connector bracket on page 44](#))

Remove the camera:

CAUTION: Use care to prevent damaging the zero-insertion force (ZIF) connector and ribbon cable.

- ▲ Disconnect the camera cable from the reverse ZIF connector **(1)**, and then use a tool to pry the camera module up to disengage the adhesive that secures it to the computer **(2)**.



Reverse this procedure to replace the IR camera.

Front-facing HD camera

Description	Spare part number
Front-facing HD camera	L31348-001
Front-facing camera bezel	L31374-001 (Plastics Kit)

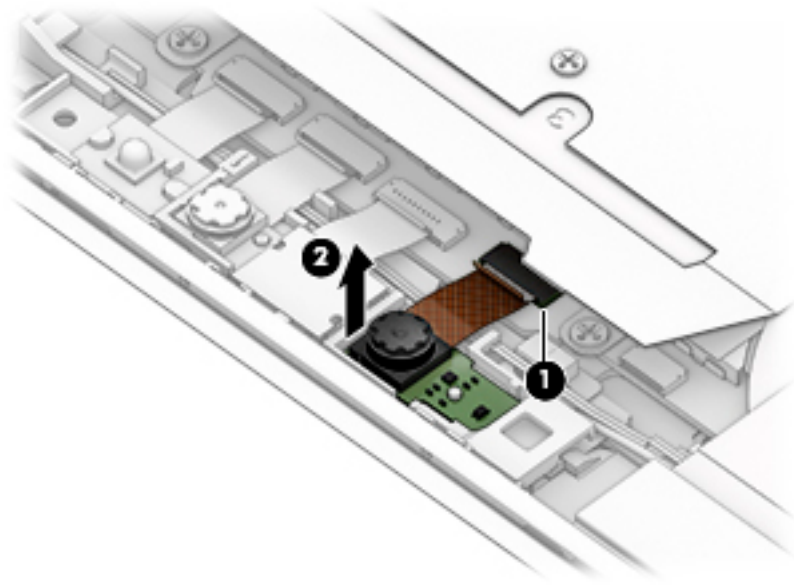
Before removing the camera, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Battery (see [Battery on page 36](#))
 - c. Camera connector bracket (see [Camera connector bracket on page 44](#))
 - d. IR camera (see [IR camera on page 45](#))

Remove the front-facing HD camera:

CAUTION: Use care to prevent damaging the zero-insertion force (ZIF) connector and ribbon cable.

- ▲ Disconnect the camera cable from the reverse ZIF connector **(1)**, and then use a tool to pry the camera module up to disengage the adhesive that secures it to the computer **(2)**.



Reverse this procedure to replace the front-facing HD camera.

Rear-facing camera

Description	Spare part number
Rear-facing camera	L31349-001

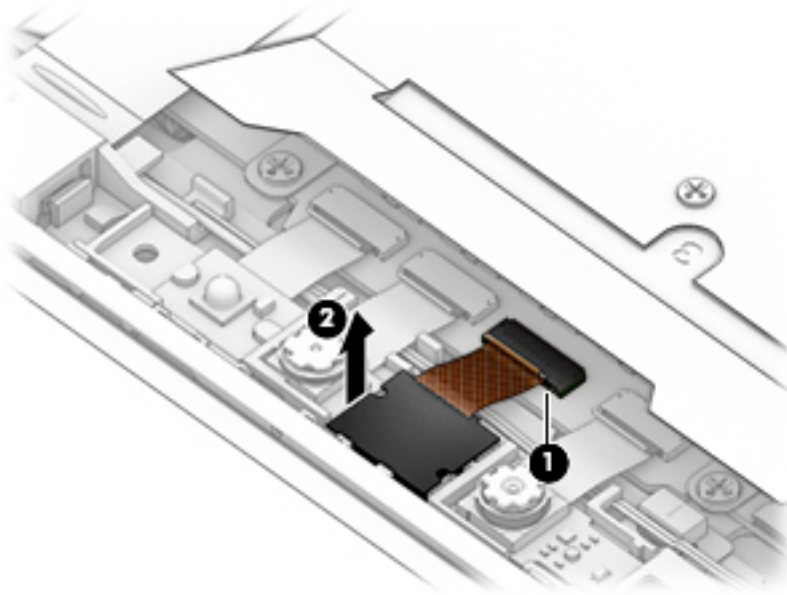
Before removing the camera, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Disconnect the battery (see [Battery on page 36](#))
 - c. Remove the camera connector bracket (see [Camera connector bracket on page 44](#))

Remove the rear-facing camera:

CAUTION: Use care to prevent damaging the zero-insertion force (ZIF) connector and ribbon cable.

- ▲ Disconnect the camera cable from the reverse ZIF connector **(1)** and then use a tool to remove the camera module from the computer **(2)**.



Reverse this procedure to replace the rear-facing camera.

Microphone board

Description	Spare part number
Microphone board (includes ambient light sensor)	L31344-001

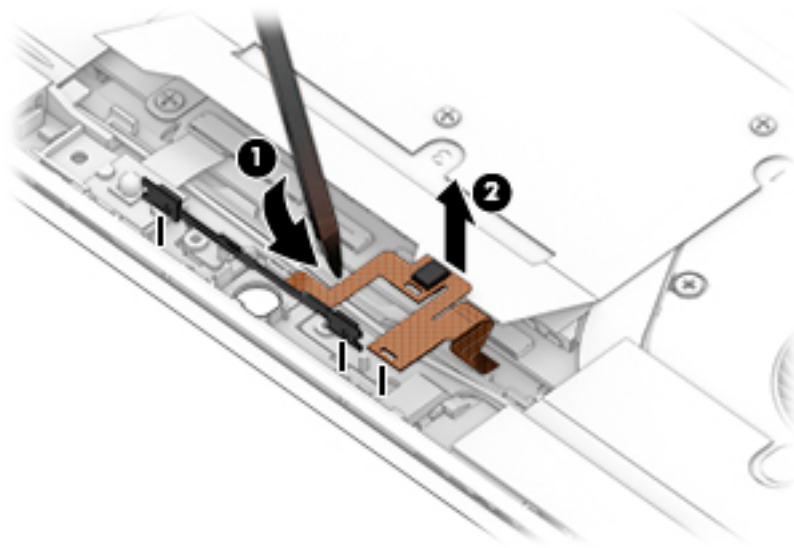
Before removing the microphone board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Disconnect the battery cable (see [Battery on page 36](#))
 - c. IR camera (see [IR camera on page 45](#))
 - d. HD camera (see [Front-facing HD camera on page 46](#))
 - e. Rear-facing camera (see [Rear-facing camera on page 47](#))

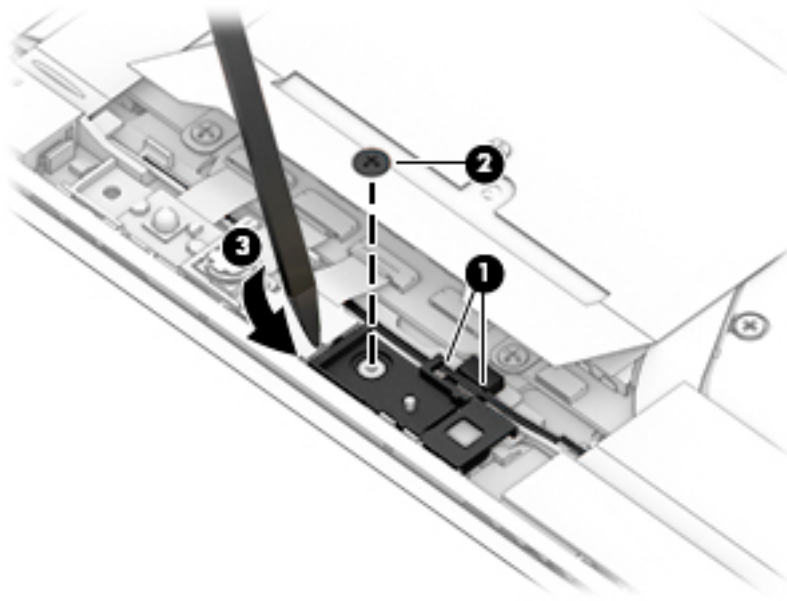
Remove the microphone board:

CAUTION: Use care to prevent damaging the zero-insertion force (ZIF) connector and ribbon cable.

1. Disconnect the microphone cable from the system board (1), and then lift the microphone board to remove it (2).



2. To remove the plastic bezel, remove speaker cable from the clip on the bezel **(1)**, remove the Phillips M1.6×1.6 screw **(2)**, and then use a tool to remove the bezel from the computer **(3)**.



Reverse this procedures to replace the microphone board.

IR LED module


Description	Spare part number
IR LED module	L31350-001

 **IMPORTANT:** Make special note of each screw size and location during removal and replacement.

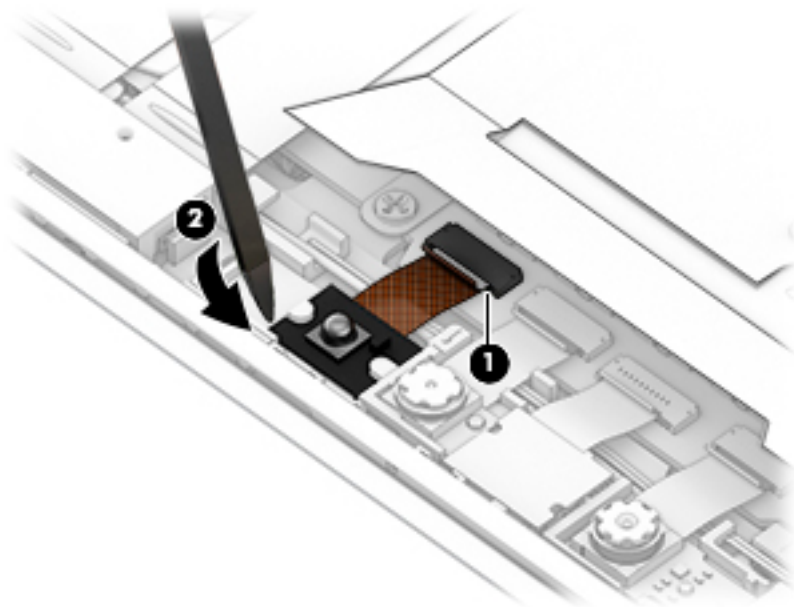
Before removing the module, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Disconnect the battery cable (see [Battery on page 36](#))
 - c. Remove the camera connector bracket (see [Camera connector bracket on page 44](#))

Remove the IR LED module:

 **CAUTION:** Use care to prevent damaging the zero-insertion force (ZIF) connector and ribbon cable.

- ▲ Disconnect the camera cable from the reverse ZIF connector **(1)** and then use a tool to pry the camera module up to disengage the adhesive that secures it to the computer **(2)**.



Reverse this procedure to replace the IR LED module.

System board

Description	Spare part number
System board with integrated Intel Core i7-8650U processor and 16 GB of system memory	L31341-601
System board with integrated Intel Core i7-8650U processor and 8 GB of system memory	L31978-601
System board with integrated Intel Core i7-8550U processor and 16 GB of system memory	L33481-601
System board with integrated Intel Core i7-8550U processor and 8 GB of system memory	L31977-601
System board with integrated Intel Core i5-8350U processor and 16 GB of system memory	L31339-601
System board with integrated Intel Core i5-8350U processor and 8 GB of system memory	L31337-601
System board with integrated Intel Core i5-8250U processor and 16 GB of system memory	L31335-601
System board with integrated Intel Core i5-8250U processor and 8 GB of system memory	L31333-601
System board with integrated Intel Core i3-8130U processor and 8 GB of system memory	L31331-601
USB bracket (includes AL foil)	L31356-001



IMPORTANT: Make special note of each screw size and location during removal and replacement.

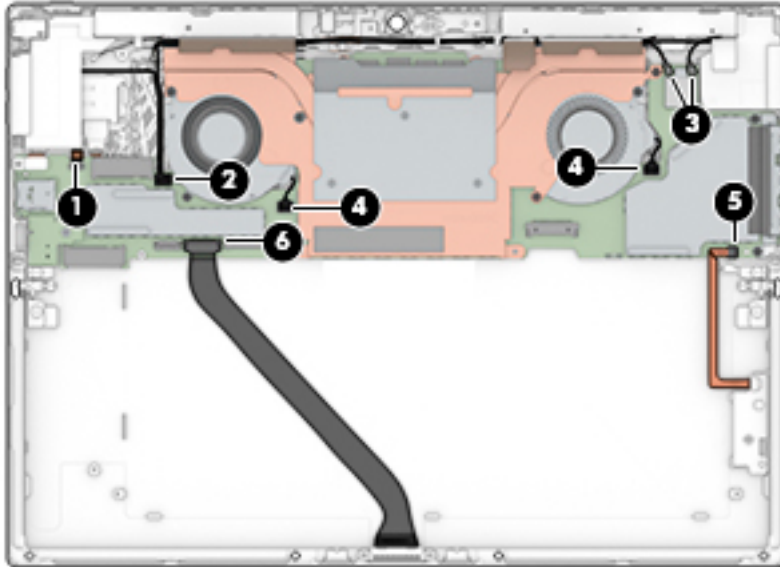
Before removing the system board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Battery (see [Battery on page 36](#))
 - c. Solid-state drive (see [Solid-state drive on page 38](#))
 - d. WWAN module (see [WWAN module \(select products only\) on page 41](#))
 - e. Camera connector bracket (see [Camera connector bracket on page 44](#))
 - f. IR camera (see [IR camera on page 45](#))
 - g. HD camera (see [Front-facing HD camera on page 46](#))
 - h. Microphone board (see [Microphone board on page 48](#))
 - i. Rear-facing camera (see [Rear-facing camera on page 47](#))
 - j. IR LED module (see [IR LED module on page 50](#))

Remove the system board:

1. Disconnect the following cables from the system board:
 - (1) Fingerprint reader cable
 - (2) Speaker cable

- (3) WLAN antenna cables
- (4) Fan cables
- (5) Hall sensor board cable
- (6) POGO cable



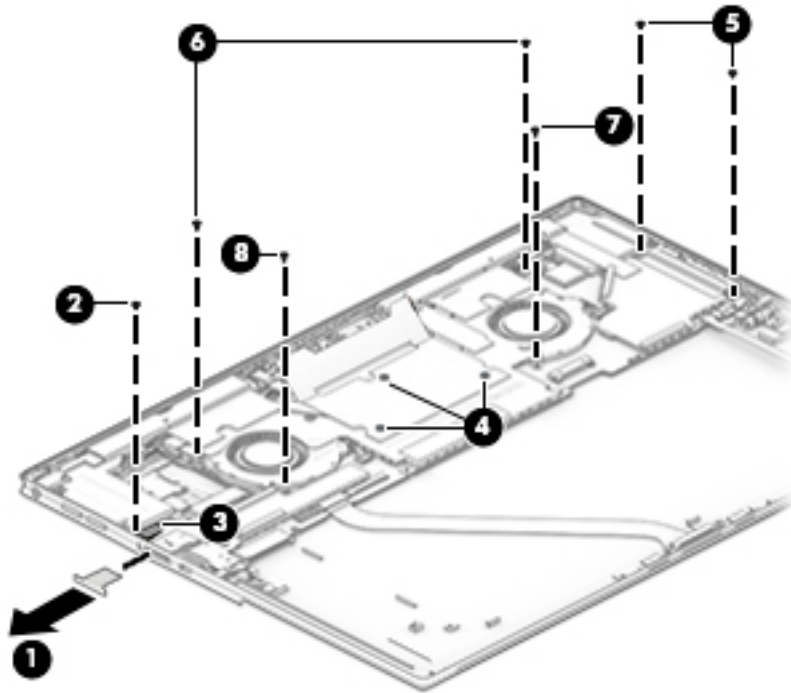
2. On models with a SIM card installed, remove the SIM tray (1).



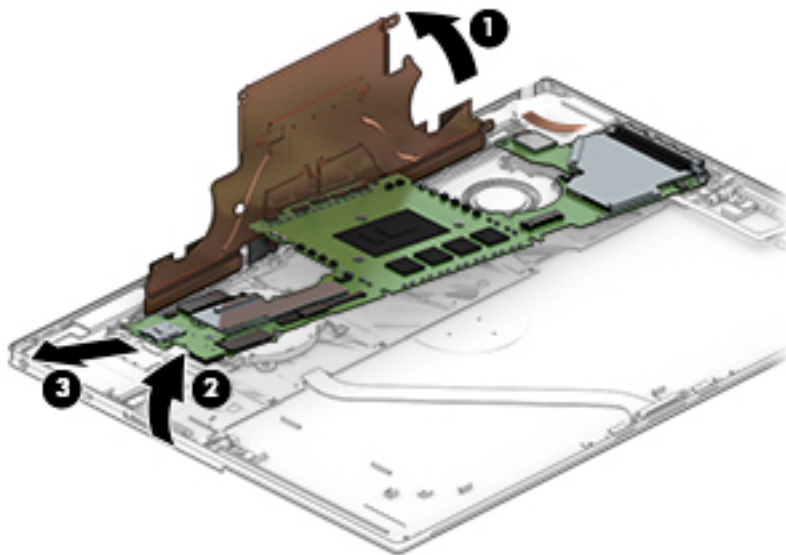
NOTE: If a SIM blank is installed, it must be removed after the system board is removed.

3. Remove the Phillips M1.6×1.6 screw (2) that secures the volume cable, and then disconnect the cable from the system board ZIF connector (3).
4. Loosen the three Phillips screws in the middle of the heat sink (4).
5. Remove the two Phillips M1.6×2.0 screws (5) from the USB bracket.
6. Remove the four Phillips M1.6×2.0 screws (6) from the top of the system board.
7. Remove the Phillips M1.6×3.0 screw (7) from the right fan.

8. Using a PH type #0 screwdriver, remove the Phillips M1.6×1.6 screw **(8)** from the left fan.

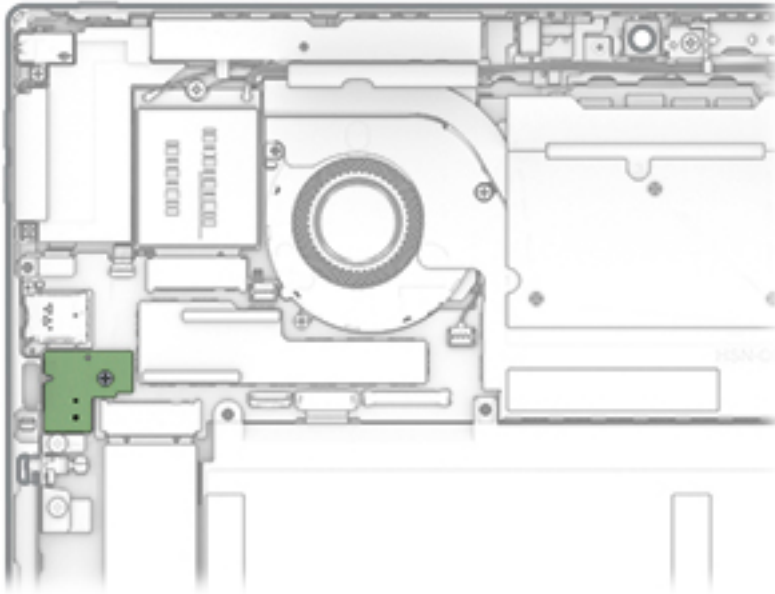


9. Lift the heat sink up to a 90 degree angle **(1)**.
10. Lift the left edge of the system board **(2)**, and then pull it away from the connectors to remove it **(3)**.



11. If a SIM blank is installed, remove it from the system board.

12. A BIOS board is connected to the system board as shown in the following image. DO NOT remove this board when removing the system board.




Reverse this procedure to replace the system board.



IMPORTANT: When installing a new system board, the thermal grease and thermal pads must be replaced. See [Heat sink on page 56](#) for more information.

Antennas

Description	Spare part number
Antennas, WLAN and WWAN	L31347-001

 **IMPORTANT:** Be careful when lifting the antennas to avoid tearing them. When the antennas use a bumper, pull the cables up evenly.

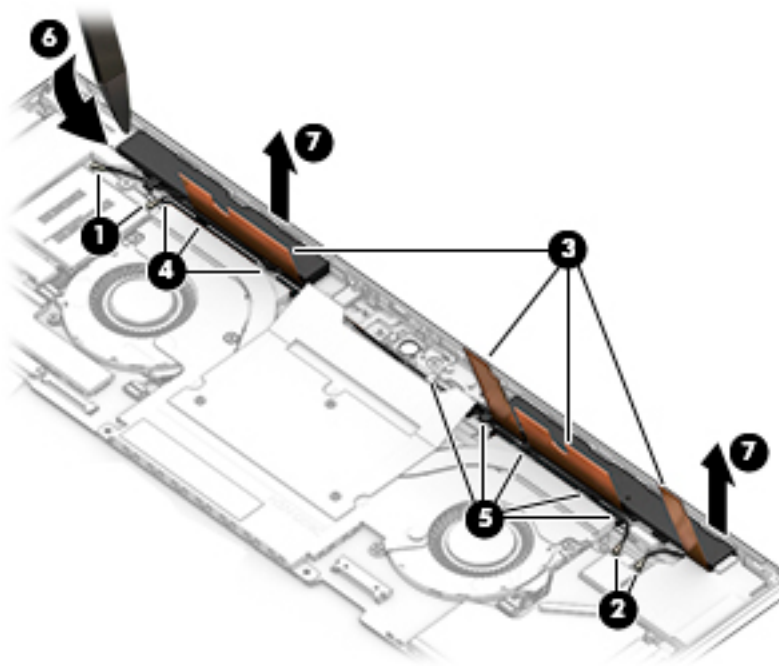
Before removing the antennas, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Disconnect the battery cable (see [Battery on page 36](#))

Remove the antennas:

1. Disconnect the WWAN antennas from the WWAN module (1) and the WLAN antennas from the system board (2).
2. Lift the copper tape (3).
3. Remove the antenna cable from the clips on the bottom of the left speaker (4) and the right speaker (5).
4. Use a tool to release the antennas (6), and then remove the antennas from the computer (7).

 **NOTE:** The antennas are adhered to the speaker.



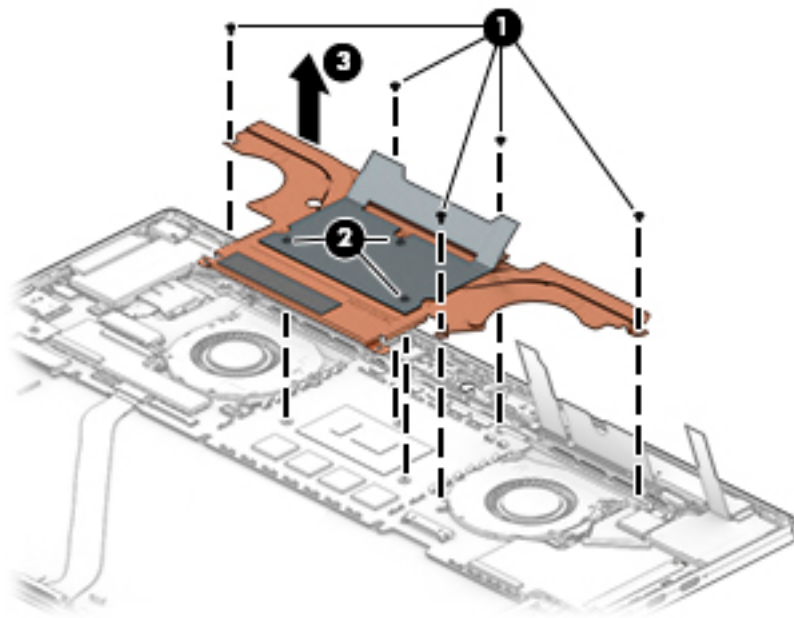
Heat sink

Description	Spare part number
Heat sink	L31354-001

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Battery (see [Battery on page 36](#))

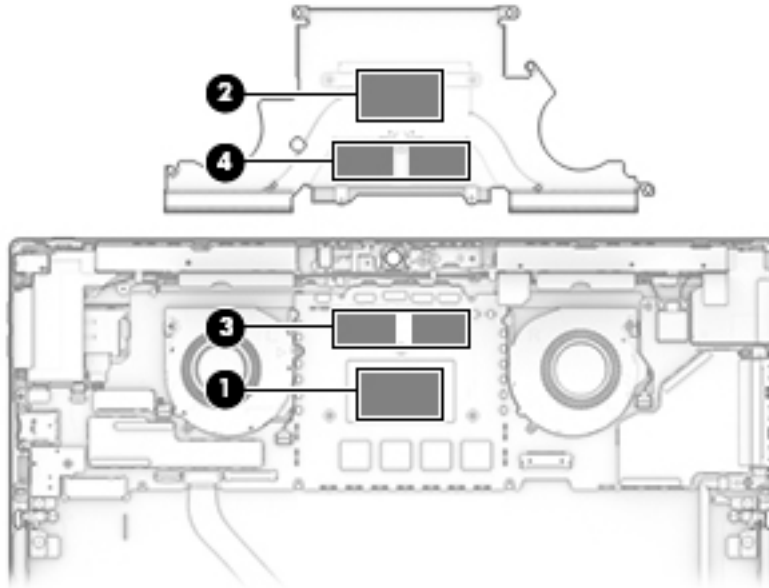
Remove the heat sink:

1. In the order indicated on the heat sink, remove the five Phillips M1.6×2.5 screws **(1)** that secure the heat sink to the system board.
2. Loosen the three captive Phillips screws **(2)** that secure the heat sink to the system board.
3. Use a tool to lever the heat sink from the system board **(3)**.



4. The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board components each time the heat sink is removed. Replacement thermal material is included with the heat sink and system board spare part kits.

Thermal pads are used on the heat sink **(2)**, **(4)** and system board **(3)**. Thermal grease is used on the system board component shown by callout **(1)** in the following image.



Reverse this procedure to replace the heat sink.

Speakers

Description	Spare part number
Speakers	L31353-001

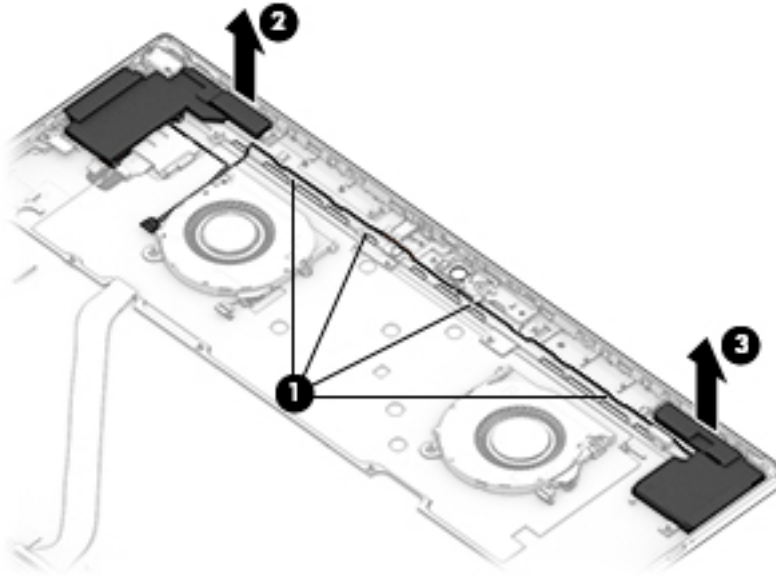
Before removing the speakers, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Battery (see [Battery on page 36](#))
 - c. Solid-state drive (see [Solid-state drive on page 38](#))
 - d. WWAN module (see [WWAN module \(select products only\) on page 41](#))
 - e. Camera connector bracket (see [Camera connector bracket on page 44](#))
 - f. IR camera (see [IR camera on page 45](#))
 - g. HD camera (see [Front-facing HD camera on page 46](#))
 - h. Microphone board (see [Microphone board on page 48](#))
 - i. Rear-facing camera (see [Rear-facing camera on page 47](#))
 - j. IR LED module (see [IR LED module on page 50](#))
 - k. System board (see [System board on page 51](#))

Remove the speakers:

1. Remove the speaker cable from the routing clips **(1)**.
2. Use a tool to release the left speaker from the adhesive that secures it **(2)**.

3. Use a tool to release the right speaker from the adhesive that secures it **(3)**.



Reverse this procedure to replace the speakers.

Fans

Description	Spare part number
Fan Kit	L31355-001

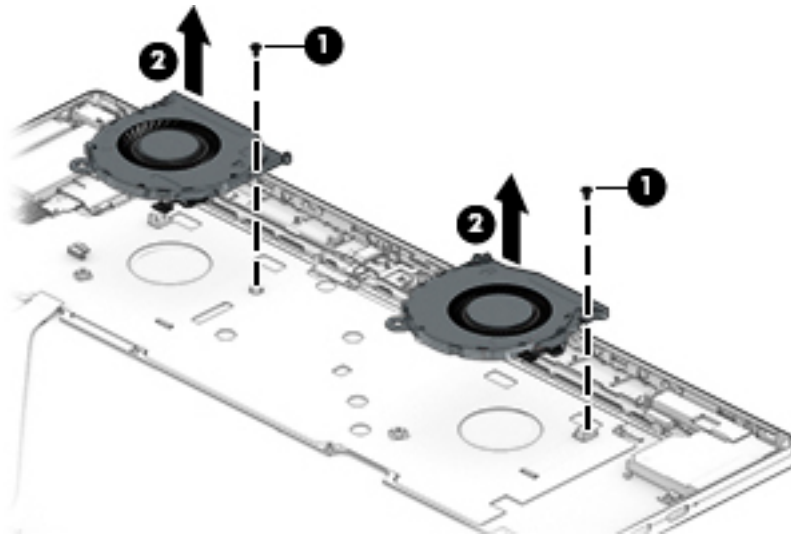
Before removing the fans, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Battery (see [Battery on page 36](#))
 - c. Solid-state drive (see [Solid-state drive on page 38](#))
 - d. WWAN module (see [WWAN module \(select products only\) on page 41](#))
 - e. Camera connector bracket (see [Camera connector bracket on page 44](#))
 - f. IR camera (see [IR camera on page 45](#))
 - g. HD camera (see [Front-facing HD camera on page 46](#))
 - h. Microphone board (see [Microphone board on page 48](#))
 - i. Rear-facing camera (see [Rear-facing camera on page 47](#))
 - j. IR LED module (see [IR LED module on page 50](#))
 - k. System board (see [System board on page 51](#))

Remove the fans:

1. Remove the Phillips M1.6×3.0 screw from each fan **(1)**.

2. Remove the fans from the computer (2).



Reverse this procedure to replace the fans.

Power button board with audio jack cable

Description	Spare part number
Power button board with audio jack cable	L35963-001

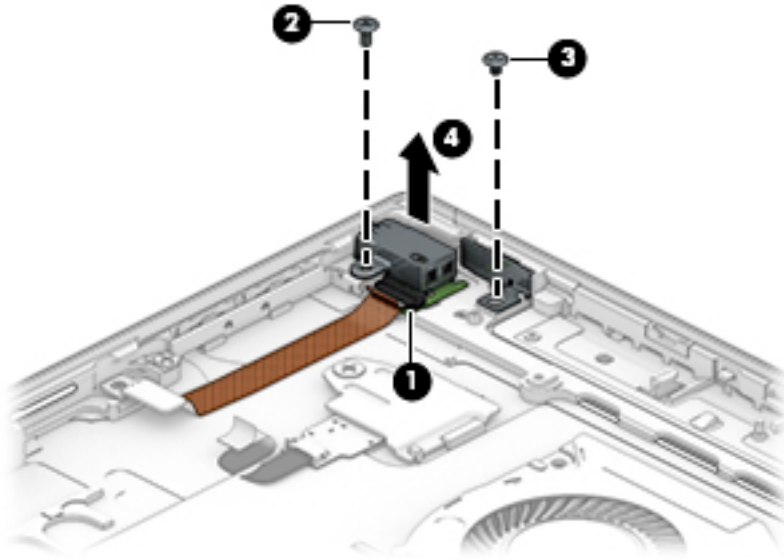
Before removing the power button board with audio jack cable, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Battery (see [Battery on page 36](#))
 - c. Solid-state drive (see [Solid-state drive on page 38](#))
 - d. WWAN module (see [WWAN module \(select products only\) on page 41](#))
 - e. Camera connector bracket (see [Camera connector bracket on page 44](#))
 - f. IR camera (see [IR camera on page 45](#))
 - g. HD camera (see [Front-facing HD camera on page 46](#))
 - h. Microphone board (see [Microphone board on page 48](#))
 - i. Rear-facing camera (see [Rear-facing camera on page 47](#))
 - j. IR LED module (see [IR LED module on page 50](#))
 - k. System board (see [System board on page 51](#))
 - l. Left speaker (see [Speakers on page 58](#))

Remove the power button board with audio jack cable:

1. Disconnect the cable from the ZIF connector on the audio jack **(1)**.
2. Remove the Phillips M1.6×3.0 screw from the audio jack **(2)**.
3. Remove the Phillips M1.6×2.0 screw from the power button board bracket **(3)**.

4. Use a tool to push the power button board up and out of the slot **(4)**.



Reverse this procedure to replace the power button board with audio jack cable.

Volume board

Description	Spare part number
Volume board	L35962-001

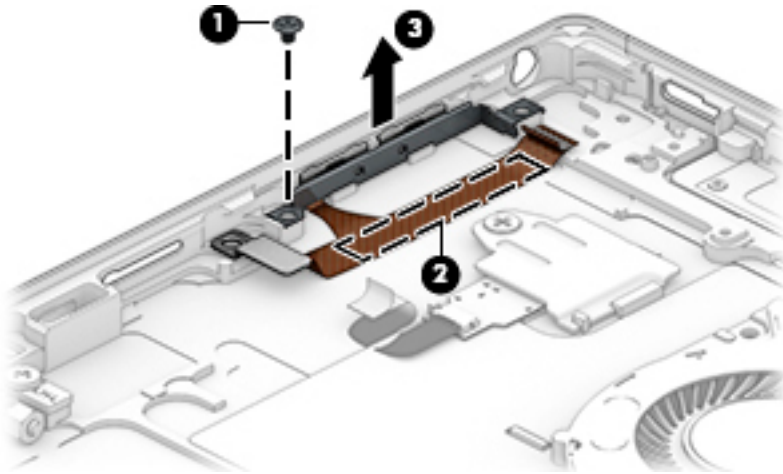
Before removing the volume board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Battery (see [Battery on page 36](#))
 - c. Solid-state drive (see [Solid-state drive on page 38](#))
 - d. WWAN module (see [WWAN module \(select products only\) on page 41](#))
 - e. Camera connector bracket (see [Camera connector bracket on page 44](#))
 - f. IR camera (see [IR camera on page 45](#))
 - g. HD camera (see [Front-facing HD camera on page 46](#))
 - h. Microphone board (see [Microphone board on page 48](#))
 - i. Rear-facing camera (see [Rear-facing camera on page 47](#))
 - j. IR LED module (see [IR LED module on page 50](#))
 - k. System board (see [System board on page 51](#))
 - l. Left speaker (see [Speakers on page 58](#))
 - m. Audio jack/power button board (see [Power button board with audio jack cable on page 62](#))

Remove the volume board:

1. Remove the Phillips M1.6×1.6 screw **(1)** that secures the assembly to the computer.

2. Peel the board/cable off the computer **(2)**, and then remove the assembly from the computer **(3)**.



Reverse this procedure to replace the volume board.

Fingerprint reader board

Description	Spare part number
Fingerprint reader board (includes bracket and cable)	L31352-001
Fingerprint reader insert (for use in models without a fingerprint reader)	L31374-001 (Plastics Kit)



IMPORTANT: Make special note of each screw size and location during removal and replacement.

Before removing the fingerprint reader board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
 - a. Display panel (see [Display panel on page 33](#))
 - b. Battery (see [Battery on page 36](#))
 - c. Solid-state drive (see [Solid-state drive on page 38](#))
 - d. WWAN module (see [WWAN module \(select products only\) on page 41](#))
 - e. Camera connector bracket (see [Camera connector bracket on page 44](#))
 - f. IR camera (see [IR camera on page 45](#))
 - g. HD camera (see [Front-facing HD camera on page 46](#))
 - h. Microphone board (see [Microphone board on page 48](#))
 - i. Rear-facing camera (see [Rear-facing camera on page 47](#))
 - j. IR LED module (see [IR LED module on page 50](#))
 - k. System board (see [System board on page 51](#))
 - l. Left speaker (see [Speakers on page 58](#))

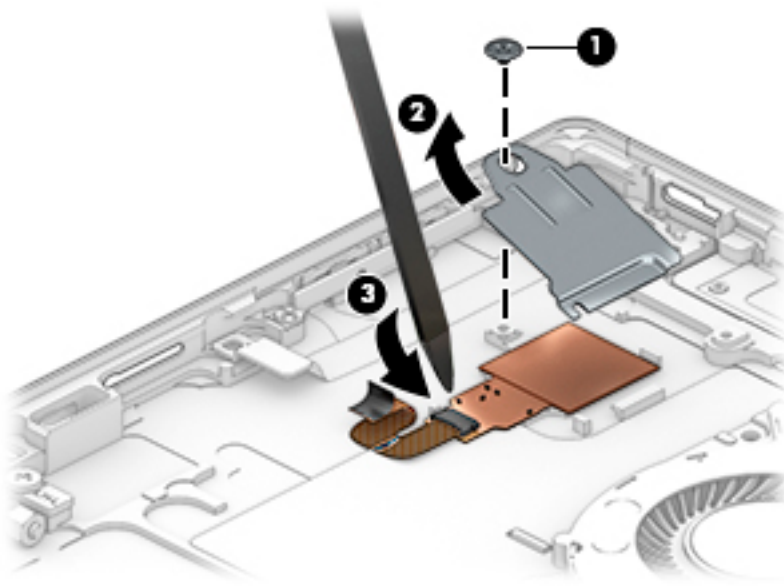
Remove the fingerprint reader board:



CAUTION: Use care to prevent damaging the ZIF connector and ribbon cable.

1. Remove the Phillips M1.6×1.6 screw that secures the bracket to the computer **(1)**.
2. Lift the bracket off the fingerprint reader **(2)**.

3. Use a tool to lift the fingerprint reader board (3) to release it from the adhesive securing it, and then remove the fingerprint reader board.

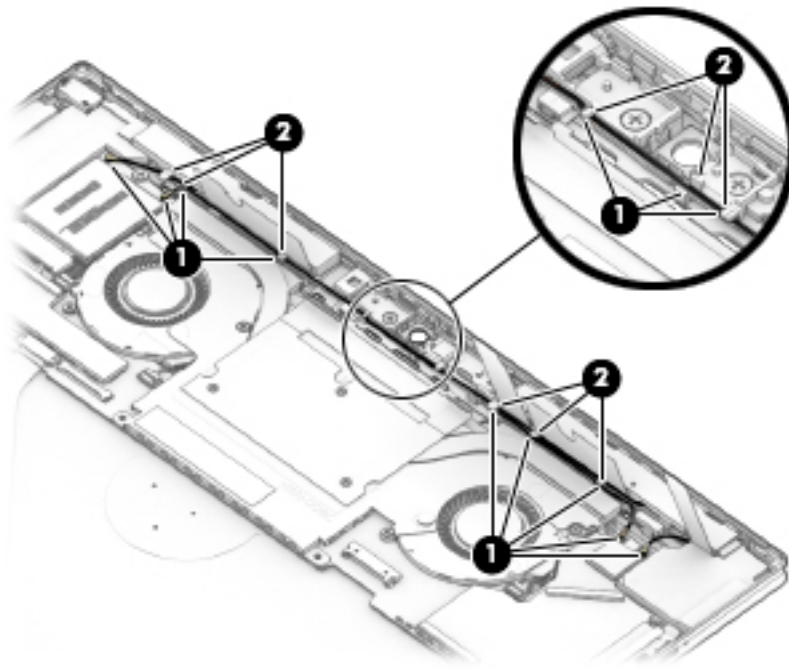


Reverse this procedure to replace the fingerprint reader board.

Cable routing

Use the following image to determine proper cable routing in the computer.

- ▲ Antenna cables **(1)** and speaker cables **(2)**.



7 Backing up, restoring, and recovering

This chapter provides information about the following processes, which are standard procedure for most products:

- **Backing up your personal information**—You can use Windows tools to back up your personal information (see [Using Windows tools on page 69](#)).
- **Creating a restore point**—You can use Windows tools to create a restore point (see [Using Windows tools on page 69](#)).
- **Creating recovery media** (select products only)—You can use HP Recovery Manager or HP Cloud Recovery Download Tool (select products only) to create recovery media (see [Creating HP Recovery media \(select products only\) on page 69](#)).
- **Restoring and recovery**—Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state (see [Using Windows tools on page 69](#)).
- **Removing the Recovery Partition**—To remove the Recovery partition to reclaim hard drive space (select products only), select the **Remove Recovery Partition** option of HP Recovery Manager. For more information, see [Removing the HP Recovery partition \(select products only\) on page 73](#).

Using Windows tools



IMPORTANT: Windows is the only option that allows you to back up your personal information. Schedule regular backups to avoid information loss.

You can use Windows tools to back up personal information and create system restore points and recovery media, allowing you to restore from backup, refresh the computer, and reset the computer to its original state.



NOTE: If computer storage is 32 GB or less, Microsoft System Restore is disabled by default.

For more information and steps, see the Get Help app.

- ▲ Select the **Start** button, and then select the **Get Help** app.



NOTE: You must be connected to the Internet to access the Get Help app.

Creating HP Recovery media (select products only)

After you have successfully set up the computer, use HP Recovery Manager to create a backup of the HP Recovery partition on the computer. This backup is called HP Recovery media. In cases where the hard drive is corrupted or has been replaced, the HP Recovery media can be used to reinstall the original operating system.

To check for the presence of the Recovery partition in addition to the Windows partition, right-click the **Start** button, select **File Explorer**, and then select **This PC**.



NOTE: If your computer does not list the Recovery partition in addition to the Windows partition, contact support to obtain recovery discs. Go to <http://www.hp.com/support>, select your country or region, and then follow the on-screen instructions.

On select products, you can use the HP Cloud Recovery Download Tool to create HP Recovery media on a bootable USB flash drive. For more information, see [Using the HP Cloud Recovery Download Tool to create recovery media on page 71](#).

Using HP Recovery Manager to create recovery media



NOTE: If you cannot create recovery media yourself, contact support to obtain recovery discs. Go to <http://www.hp.com/support>, select your country or region, and then follow the on-screen instructions.

Before you begin

Before you begin, note the following:

- Only one set of recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.
- HP Recovery Manager examines the computer and determines the required media storage capacity.
- To create recovery media, use one of the following options:



NOTE: If the computer does not have a recovery partition, HP Recovery Manager displays the Windows Create a Recovery Drive feature. Follow the on-screen instructions to create a recovery image on a blank USB flash drive or hard drive.

- If your computer has an optical drive with DVD writer capability, be sure to use only high-quality blank DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs, which are not compatible with HP Recovery Manager software.
- If your computer does not include an integrated optical drive with DVD writer capability, you can use an external optical drive (purchased separately) to create recovery discs, as described above. If an external optical drive is used, you must connect it directly to a USB port on the computer. It cannot be connected to a USB port on an external device, such as a USB hub.
- To create a recovery flash drive, use a high-quality blank USB flash drive.
- Be sure that the computer is connected to AC power before you begin creating the recovery media.
- The creation process can take an hour or more. Do not interrupt this process.
- If necessary, you can exit the program before you have finished creating all of the recovery media. HP Recovery Manager will finish the current DVD or flash drive. The next time you start HP Recovery Manager, you will be prompted to continue.

Creating the recovery media

To create HP Recovery media using HP Recovery Manager:



IMPORTANT: For a tablet with a detachable keyboard, connect the tablet to the keyboard base before beginning these steps.

1. Type `recovery` in the taskbar search box, and then select **HP Recovery Manager**.
2. Select **Create recovery media**, and then follow the on-screen instructions.

If you need to recover the system, see [Recovering using HP Recovery Manager on page 71](#).


Using the HP Cloud Recovery Download Tool to create recovery media

To create HP Recovery media using the HP Cloud Recovery Download Tool:

1. Go to <http://www.hp.com/support>.
2. Select **Software and Drivers**, and then follow the on-screen instructions.

Restoring and recovery

Restoring and recovery can be performed using one or more of the following options: Windows tools, HP Recovery Manager, or the HP Recovery partition.

 **IMPORTANT:** Not all methods are available on all products.


Restoring, resetting, and refreshing using Windows tools

Windows offers several options for restoring, resetting, and refreshing the computer. For details, see [Using Windows tools on page 69](#).

Restoring using HP Recovery Manager and the HP Recovery partition

You can use HP Recovery Manager and the HP Recovery partition (select products only) to restore the computer to the original factory state:


- **Resolving problems with preinstalled applications or drivers**—To correct a problem with a preinstalled application or driver:
 1. Type `recovery` in the taskbar search box, and then select **HP Recovery Manager**.
 2. Select **Reinstall drivers and/or applications**, and then follow the on-screen instructions.
- **Using System Recovery**—To recover the Windows partition to original factory content, select the **System Recovery** option from the HP Recovery partition (select products only) or use the HP Recovery media. For more information, see [Recovering using HP Recovery Manager on page 71](#). If you have not already created recovery media, see [Creating HP Recovery media \(select products only\) on page 69](#).
- **Using Factory Reset** (select products only)—Restores the computer to its original factory state by deleting all information from the hard drive and recreating the partitions and then reinstalling the operating system and the software that was installed at the factory (select products only). To use the **Factory Reset** option, you must use HP Recovery media. If you have not already created recovery media, see [Creating HP Recovery media \(select products only\) on page 69](#).

 **NOTE:** If you have replaced the hard drive in the computer, you can use the Factory Reset option to install the operating system and the software that was installed at the factory.


Recovering using HP Recovery Manager

You can use HP Recovery Manager software to recover the computer to its original factory state by using the HP Recovery media that you either created or that you obtained from HP, or by using the HP Recovery partition (select products only).

If you have not already created HP Recovery media, see [Creating HP Recovery media \(select products only\) on page 69](#).

 **IMPORTANT:** HP Recovery Manager does not automatically provide backups of your personal data. Before beginning recovery, back up any personal data that you want to retain. See [Using Windows tools on page 69](#).

IMPORTANT: Recovery through HP Recovery Manager should be used as a final attempt to correct computer issues.

 **NOTE:** When you start the recovery process, only the options available for your computer are displayed.

Before you begin, note the following:


- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's website or reinstall the software from the media provided by the manufacturer.
- If the computer hard drive fails, HP Recovery media must be used. This media is created using HP Recovery Manager. See [Creating HP Recovery media \(select products only\) on page 69](#).
- If your computer does not allow the creation of HP Recovery media or if the HP Recovery media does not work, contact support to obtain recovery media. Go to <http://www.hp.com/support>, select your country or region, and then follow the on-screen instructions.

Recovering using the HP Recovery partition (select products only)

The HP Recovery partition allows you to perform a system recovery without recovery discs or a recovery USB flash drive. This type of recovery can be used only if the hard drive is still working.

The HP Recovery partition (select products only) allows System Recovery only.

To start HP Recovery Manager from the HP Recovery partition:

 **IMPORTANT:** For a tablet with a detachable keyboard, connect the tablet to the keyboard base before beginning these steps (select products only).

1. Type `recovery` in the taskbar search box, select **HP Recovery Manager**, and then select **Windows Recovery Environment**.

– or –


For computers or tablets with keyboards attached:

- ▲ Press **f11** while the computer boots, or press and hold **f11** as you press the power button.

For tablets without keyboards:

- ▲ Turn on or restart the tablet, quickly hold down the volume up button, and then select **f11**.

2. Select **Troubleshoot** from the boot options menu.
3. Select **Recovery Manager**, and then follow the on-screen instructions.

 **NOTE:** If your computer does not automatically restart in HP Recovery Manager, change the computer boot order, and then follow the on-screen instructions. See [Changing the computer boot order on page 73](#).

Recovering using HP Recovery media

If your computer does not have an HP Recovery partition or if the hard drive is not working properly, you can use HP Recovery media to recover the original operating system and software programs that were installed at the factory.

- ▲ Insert the HP Recovery media, and then restart the computer.



NOTE: If your computer does not automatically restart in HP Recovery Manager, change the computer boot order, and then follow the on-screen instructions. See [Changing the computer boot order on page 73](#).

Changing the computer boot order

If your computer does not restart in HP Recovery Manager, you can change the computer boot order. This is the order of devices listed in BIOS where the computer looks for startup information. You can change the selection to an optical drive or a USB flash drive, depending on the location of your HP Recovery media.

To change the boot order:



IMPORTANT: For a tablet with a detachable keyboard, connect the tablet to the keyboard base before beginning these steps.

1. Insert the HP Recovery media.
2. Access the system **Startup** menu.

For computers or tablets with keyboards attached:

- ▲ Turn on or restart the computer or tablet, quickly press **esc**, and then press **f9** for boot options.

For tablets without keyboards:

- ▲ Turn on or restart the tablet, quickly hold down the volume up button, and then select **f9**.

– or –

Turn on or restart the tablet, quickly hold down the volume down button, and then select **f9**.

3. Select the optical drive or USB flash drive from which you want to boot, and then follow the on-screen instructions.

Removing the HP Recovery partition (select products only)

HP Recovery Manager software allows you to remove the HP Recovery partition (select products only) to free up hard drive space.



IMPORTANT: After you remove the HP Recovery partition, you will not be able to perform System Recovery or create HP Recovery media. Before removing the Recovery partition, create HP Recovery media. See [Creating HP Recovery media \(select products only\) on page 69](#).

Follow these steps to remove the HP Recovery partition:

1. Type `recovery` in the taskbar search box, and then select **HP Recovery Manager**.
2. Select **Remove Recovery Partition**, and then follow the on-screen instructions.

8 Computer Setup (BIOS), TPM, and HP Sure Start

Using Computer Setup

Computer Setup, or Basic Input/Output System (BIOS), controls communication between all the input and output devices on the system (such as disk drives, display, keyboard, mouse, and printer). Computer Setup includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.



NOTE: Use extreme care when making changes in Computer Setup. Errors can prevent the computer from operating properly.

Starting Computer Setup

- Computers or tablets with keyboards:
 - ▲ Turn on or restart the computer, and when the HP logo appears, press **f10** to enter Computer Setup.
- Computers or tablets without keyboards:
 - ▲ Turn off the computer. Press the power button in combination with the volume down button until the Startup menu is displayed, and then tap **f10** to enter Computer Setup.

Using a USB keyboard or USB mouse to start Computer Setup (BIOS)

You can start Computer Setup by using a keyboard or mouse connected to a USB port, but you must first disable FastBoot.

1. Enter the **Boot Device Options** menu.
 - Computers or tablets with keyboards:
 - ▲ Turn on or restart the computer, and when the HP logo appears, press **f9** to enter the **Boot Device Options** menu.
 - Computers or tablets without keyboards:
 - ▲ Turn off the computer. Press the power button in combination with the volume down button until the Startup menu is displayed, and then press **f9** to enter the **Boot Device Options** menu.
2. Clear the check box for **FastBoot**.
3. To save your changes and exit, select the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.
– or –
Select **Main**, select **Save Changes and Exit**, and then press **enter**.

Your changes go into effect when the computer restarts.

Navigating and selecting in Computer Setup

- To select a menu or a menu item, use the **tab** key and the keyboard arrow keys and then press **enter**, or use a pointing device to select the item.



NOTE: On tablets without keyboards, you can use your finger to make selections.

- To scroll up and down, select the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key on the keyboard.
- To close open dialog boxes and return to the main Computer Setup screen, press **esc**, and then follow the on-screen instructions.

To exit Computer Setup menus, choose one of the following methods:

- To exit Computer Setup menus without saving your changes:
Select the **Exit** icon in the lower-right corner of the screen, and then follow the on-screen instructions.
– or –
Select **Main**, select **Ignore Changes and Exit**, and then press **enter**.
- To save your changes and exit Computer Setup menus:
Select the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.
– or –
Select **Main**, select **Save Changes and Exit**, and then press **enter**.

Your changes go into effect when the computer restarts.

Restoring factory settings in Computer Setup



NOTE: Restoring defaults will not change the hard drive mode.

To return all settings in Computer Setup to the values that were set at the factory, follow these steps:

1. Start Computer Setup. See [Starting Computer Setup on page 74](#).
2. Select **Main**, and then select **Apply Factory Defaults and Exit**.



NOTE: On select products, the selections may display **Restore Defaults** instead of **Apply Factory Defaults and Exit**.

3. Follow the on-screen instructions.
4. To save your changes and exit, select the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.
– or –
Select **Main**, select **Save Changes and Exit**, and then press **enter**.

Your changes go into effect when the computer restarts.



NOTE: Your password settings and security settings are not changed when you restore the factory settings.

Updating the BIOS

Updated versions of the BIOS may be available on the HP website.

Most BIOS updates on the HP website are packaged in compressed files called *SoftPaqs*.

Some download packages contain a file named Readme.txt, which contains information regarding installing and troubleshooting the file.

Determining the BIOS version

To decide whether you need to update Computer Setup (BIOS), first determine the BIOS version on your computer.

BIOS version information (also known as *ROM date* and *System BIOS*) can be accessed by pressing **fn+esc** (if you are already in Windows) or by using Computer Setup.


1. Start Computer Setup. See [Starting Computer Setup on page 74](#).
2. Select **Main**, and then select **System Information**.
3. To exit Computer Setup without saving your changes, select the **Exit** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

Select **Main**, select **Ignore Changes and Exit**, and then press **enter**.

To check for later BIOS versions, see [Downloading a BIOS update on page 76](#).

Downloading a BIOS update

 **CAUTION:** To reduce the risk of damage to the computer or an unsuccessful installation, download and install a BIOS update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a BIOS update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation, follow these instructions:

Do not disconnect power on the computer by unplugging the power cord from the AC outlet.

Do not shut down the computer or initiate Sleep.

Do not insert, remove, connect, or disconnect any device, cable, or cord.

1. Type `support` in the taskbar search box, and then select the HP Support Assistant app.
– or –
Select the question mark icon in the taskbar.
2. Select **Updates**, and then select **Check for updates and messages**.
3. Follow the on-screen instructions.
4. At the download area, follow these steps:
 - a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
 - b. Follow the on-screen instructions to download your selection to the hard drive.

Make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.



NOTE: If you connect your computer to a network, consult the network administrator before installing any software updates, especially system BIOS updates.

BIOS installation procedures vary. Follow any instructions that are displayed on the screen after the download is complete. If no instructions are displayed, follow these steps:

1. Type `file` in the taskbar search box, and then select **File Explorer**.
2. Select your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder that contains the update.
4. Double-click the file that has an .exe extension (for example, *filename.exe*).

The BIOS installation begins.

5. Complete the installation by following the on-screen instructions.



NOTE: After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.

Changing the boot order using the f9 prompt

To dynamically choose a boot device for the current startup sequence, follow these steps:

1. Access the Boot Device Options menu:
 - Computers or tablets with keyboards:
 - ▲ Turn on or restart the computer, and when the HP logo appears, press **f9** to enter the **Boot Device Options** menu.
 - Computers or tablets without keyboards:
 - ▲ Turn off the computer. Press the power button in combination with the volume down button until the Startup menu is displayed, and then press **f9** to enter the **Boot Device Options** menu.
2. Select a boot device, press **enter**, and then follow the on-screen instructions.

TPM BIOS settings (select products only)



IMPORTANT: Before enabling Trusted Platform Module (TPM) functionality on this system, you must ensure that your intended use of TPM complies with relevant local laws, regulations and policies, and approvals or licenses must be obtained if applicable. For any compliance issues arising from your operation/usage of TPM which violates the above mentioned requirement, you shall bear all the liabilities wholly and solely. HP will not be responsible for any related liabilities.

TPM provides additional security for your computer. You can modify the TPM settings in Computer Setup (BIOS).



NOTE: If you change the TPM setting to Hidden, TPM is not visible in the operating system.

To access TPM settings in Computer Setup:

1. Start Computer Setup. See [Starting Computer Setup on page 74](#).
2. Select **Security**, select **TPM Embedded Security**, and then follow the on-screen instructions.

Using HP Sure Start (select products only)

Select computer models are configured with HP Sure Start, a technology that monitors the computer's BIOS for attacks or corruption. If the BIOS becomes corrupted or is attacked, HP Sure Start automatically restores the BIOS to its previously safe state, without user intervention.

HP Sure Start is configured and already enabled so that most users can use the HP Sure Start default configuration. The default configuration can be customized by advanced users.

To access the latest documentation on HP Sure Start, go to <http://www.hp.com/support>. Select **Find your product**, and then follow the on-screen instructions.

9 Using HP PC Hardware Diagnostics

Using HP PC Hardware Diagnostics Windows (select products only)

HP PC Hardware Diagnostics Windows is a Windows-based utility that allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs within the Windows operating system in order to diagnose hardware failures.

If HP PC Hardware Diagnostics Windows is not installed on your computer, first you must download and install it. To download HP PC Hardware Diagnostics Windows, see [Downloading HP PC Hardware Diagnostics Windows on page 79](#).

After HP PC Hardware Diagnostics Windows is installed, follow these steps to access it from HP Help and Support or HP Support Assistant.

1. To access HP PC Hardware Diagnostics Windows from HP Help and Support:
 - a. Select the **Start** button, and then select **HP Help and Support**.
 - b. Right-click **HP PC Hardware Diagnostics Windows**, select **More**, and then select **Run as administrator**.


– or –

To access HP PC Hardware Diagnostics Windows from HP Support Assistant:

 - a. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.

– or –

Select the question mark icon in the taskbar.

 - b. Select **Troubleshooting and fixes**.
 - c. Select **Diagnostics**, and then select **HP PC Hardware Diagnostics Windows**.
 2. When the tool opens, select the type of diagnostic test you want to run, and then follow the on-screen instructions.
-
-  **NOTE:** If you need to stop a diagnostic test at any time, select **Cancel**.
3. When HP PC Hardware Diagnostics Windows detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. For assistance in correcting the problem, contact support, and then provide the Failure ID code.

Downloading HP PC Hardware Diagnostics Windows

- The HP PC Hardware Diagnostics Windows download instructions are provided in English only.
- You must use a Windows computer to download this tool because only .exe files are provided.

Downloading the latest HP PC Hardware Diagnostics Windows version

To download HP PC Hardware Diagnostics Windows, follow these steps:

1. Go to <http://www.hp.com/go/techcenter/pcdiags>. The HP PC Diagnostics home page is displayed.
2. In the **HP PC Hardware Diagnostics** section, select **Download**, and then select a location on your computer or a USB flash drive.

The tool is downloaded to the selected location.

Downloading HP Hardware Diagnostics Windows by product name or number (select products only)

 **NOTE:** For some products, it may be necessary to download the software to a USB flash drive by using the product name or number.

To download HP PC Hardware Diagnostics Windows by product name or number, follow these steps:

1. Go to <http://www.hp.com/support>.
2. Select **Get software and drivers**, select your type of product, and then enter the product name or number in the search box that is displayed.
3. In the **HP PC Hardware Diagnostics** section, select **Download**, and then select a location on your computer or a USB flash drive.


The tool is downloaded to the selected location.

Installing HP PC Hardware Diagnostics Windows

To install HP PC Hardware Diagnostics Windows, follow these steps:

- ▲ Navigate to the folder on your computer or the flash drive where the .exe file was downloaded, double-click the .exe file, and then follow the on-screen instructions.


Using HP PC Hardware Diagnostics UEFI

 **NOTE:** For Windows 10 S computers, you must use a Windows computer and a USB flash drive to download and create the HP UEFI support environment because only .exe files are provided. For more information, see [Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive on page 81](#).

HP PC Hardware Diagnostics UEFI (Unified Extensible Firmware Interface) allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs outside the operating system so that it can isolate hardware failures from issues that are caused by the operating system or other software components.

If your PC will not boot into Windows, you can use HP PC Hardware Diagnostics UEFI to diagnose hardware issues.

When HP PC Hardware Diagnostics UEFI detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. For assistance in correcting the problem, contact support, and provide the Failure ID code.

 **NOTE:** To start diagnostics on a convertible computer, your computer must be in notebook mode, and you must use the attached keyboard.

 **NOTE:** If you need to stop a diagnostic test, press **esc**.

Starting HP PC Hardware Diagnostics UEFI

To start HP PC Hardware Diagnostics UEFI, follow these steps:

1. Turn on or restart the computer, and quickly press [esc](#).
2. Press [f2](#).

The BIOS searches three places for the diagnostic tools, in the following order:

- a. Connected USB flash drive



NOTE: To download the HP PC Hardware Diagnostics UEFI tool to a USB flash drive, see [Downloading the latest HP PC Hardware Diagnostics UEFI version on page 81](#).

- b. Hard drive

- c. BIOS

3. When the diagnostic tool opens, select the type of diagnostic test you want to run, and then follow the on-screen instructions.

Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive

Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive can be useful in the following situations:

- HP PC Hardware Diagnostics UEFI is not included in the preinstall image.
- HP PC Hardware Diagnostics UEFI is not included in the HP Tool partition.
- The hard drive is damaged.



NOTE: The HP PC Hardware Diagnostics UEFI download instructions are provided in English only, and you must use a Windows computer to download and create the HP UEFI support environment because only .exe files are provided.

Downloading the latest HP PC Hardware Diagnostics UEFI version

To download the latest HP PC Hardware Diagnostics UEFI version to a USB flash drive:

1. Go to <http://www.hp.com/go/techcenter/pcdiags>. The HP PC Diagnostics home page is displayed.
2. In the **HP PC Hardware Diagnostics UEFI** section, select **Download UEFI Diagnostics**, and then select **Run**.

Downloading HP PC Hardware Diagnostics UEFI by product name or number (select products only)



NOTE: For some products, it may be necessary to download the software to a USB flash drive by using the product name or number.

To download HP PC Hardware Diagnostics UEFI by product name or number (select products only) to a USB flash drive:

1. Go to <http://www.hp.com/support>.
2. Enter the product name or number, select your computer, and then select your operating system.
3. In the **Diagnostics** section, follow the on-screen instructions to select and download the specific UEFI Diagnostics version for your computer.

Using Remote HP PC Hardware Diagnostics UEFI settings (select products only)

Remote HP PC Hardware Diagnostics UEFI is a firmware (BIOS) feature that downloads HP PC Hardware Diagnostics UEFI to your computer. It can then execute the diagnostics on your computer, and it may upload results to a preconfigured server. For more information on Remote HP PC Hardware Diagnostics UEFI, go to <http://www.hp.com/go/techcenter/pcdiags>, and then select **Find out more**.

Downloading Remote HP PC Hardware Diagnostics UEFI



NOTE: HP Remote PC Hardware Diagnostics UEFI is also available as a Softpaq that can be downloaded to a server.

Downloading the latest Remote HP PC Hardware Diagnostics UEFI version

To download the latest Remote HP PC Hardware Diagnostics UEFI version, follow these steps:

1. Go to <http://www.hp.com/go/techcenter/pcdiags>. The HP PC Diagnostics home page is displayed.
2. In the **HP PC Hardware Diagnostics UEFI** section, select **Download Remote Diagnostics**, and then select **Run**.

Downloading Remote HP PC Hardware Diagnostics UEFI by product name or number



NOTE: For some products, it may be necessary to download the software by using the product name or number.

To download HP Remote PC Hardware Diagnostics UEFI by product name or number, follow these steps:

1. Go to <http://www.hp.com/support>.
2. Select **Get software and drivers**, select your type of product, enter the product name or number in the search box that is displayed, select your computer, and then select your operating system.
3. In the **Diagnostics** section, follow the on-screen instructions to select and download the **Remote UEFI** version for the product.

Customizing Remote HP PC Hardware Diagnostics UEFI settings

Using the Remote HP PC Hardware Diagnostics setting in Computer Setup (BIOS), you can perform the following customizations:

- Set a schedule for running diagnostics unattended. You can also start diagnostics immediately in interactive mode by selecting **Execute Remote HP PC Hardware Diagnostics**.
- Set the location for downloading the diagnostic tools. This feature provides access to the tools from the HP website or from a server that has been preconfigured for use. Your computer does not require the traditional local storage (such as a disk drive or USB flash drive) to run remote diagnostics.
- Set a location for storing the test results. You can also set the user name and password settings used for uploads.
- Display status information about the diagnostics run previously.

To customize Remote HP PC Hardware Diagnostics UEFI settings, follow these steps:

1. Turn on or restart the computer, and when the HP logo appears, press **f10** to enter Computer Setup.
2. Select **Advanced**, and then select **Settings**.

3. Make your customization selections.
4. Select **Main**, and then **Save Changes and Exit** to save your settings.

Your changes take effect when the computer restarts.

10 Specifications

Computer specifications

	Tablet	Keyboard	Tablet and Keyboard
Dimensions			
Width	300.0 mm (11.81 in)	300.0 mm (11.81 in)	300.0 mm (11.81 in)
Depth	217.25 mm (8.55 in)	231.5 mm (9.11 in)	231.5 mm (8.65 in)
Height	7.9 mm (0.31 in)	4.9 mm (0.19 in)	13.3 mm (0.52 in)
Weight	820 g (1.81 lb)	353 g (0.78 lb)	1173 g (2.59 lb)
Operating voltage and current	5 V dc @ 3 A / 9 V dc @ 3A / 10 V dc @ 5 A / 12 V dc @ 5 A / 15 V dc @ 4.33 A / 20 V dc @ 3.25 A - 65 W USB-C		
Temperature			
Operating	32° to 95° F (0° to 35° C) (not writing optical) 41° to 95° F (5° to 35° C) (writing optical)		
Nonoperating	-4° to 140° F (-20° to 60° C)		
Relative humidity (noncondensing)			
Operating	10% to 90%		
Nonoperating	5% to 95%		
Shock			
Operating	40 G, 2 ms, half-sine		
Nonoperating	240 G, 2 ms, half-sine		
Random Vibration			
Operating	1.043 grms		
Nonoperating	3.50 grms		
Maximum altitude (unpressurized)			
Operating	50 to 10,000 ft (-15.24 to 3,048 m)		
Nonoperating	-50 to 40,000 ft (-15.24 to 12,192 m)		
NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.			

Display specifications

Item	Value
Active diagonal size	13.0" (33.02 cm)
Brightness	72% CG; 450 nits
Pixel resolution	3000 × 2000 (3k×2k+) 1920 x 1280 (WUXGA+)
Surface treatment	3k×2k+: BrightView WUXGA+: anti glare
Interface	eDP 1.4+PSR
Backlight	WLED
Viewing angle	UWVA 85/85/85/85 (Left/Right/Down/Up)

11 Power cord set requirements

The wide-range input feature of the computer permits it to operate from any line voltage from 100 to 120 V ac, or from 220 to 240 V ac.

The 3-conductor power cord set included with the computer meets the requirements for use in the country or region where the equipment is purchased.

Power cord sets for use in other countries or regions must meet the requirements of the country and region where the computer is used.

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.0 m** (3.3 ft) and no more than **2.0 m** (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 A and a nominal voltage rating of 125 or 250 V ac, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

Country/region	Accredited agency	Applicable note number
Argentina	IRAM	1
Australia	SAA	1
Austria	OVE	1
Belgium	CEBEC	1
Brazil	ABNT	1
Canada	CSA	2
Chile	IMQ	1
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
India	ISI	1
Israel	SII	1
Italy	IMQ	1
Japan	JIS	3
The Netherlands	KEMA	1
New Zealand	SANZ	1
Norway	NEMKO	1
The People's Republic of China	CCC	4
Saudi Arabia	SASO	7
Singapore	PSB	1
South Africa	SABS	1
South Korea	KTL	5
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	6
Thailand	TISI	1
The United Kingdom	ASTA	1
The United States	UL	2

1. The flexible cord must be Type H05VV-F, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.

Country/region	Accredited agency	Applicable note number
		<p>3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm² or 1.25 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.</p> <p>4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.</p> <p>5. The flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.</p> <p>6. The flexible cord must be Type HVCTF 3-conductor, 1.25 mm² conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.</p> <p>7. For 127 V ac, the flexible cord must be Type SVT or SJT 3-conductor, 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² or 1.00 mm² conductor size, with plug BS 1363/A with BSI or ASTA marks.</p>

12 Statement of memory volatility

The purpose of this chapter is to provide general information regarding nonvolatile memory in HP Business computers. This chapter also provides general instructions for restoring nonvolatile memory that can contain personal data after the system has been powered off and the hard drive has been removed.

HP Business computer products that use Intel®-based or AMD®-based system boards contain volatile DDR memory. The amount of nonvolatile memory present in the system depends upon the system configuration. Intel-based and AMD-based system boards contain nonvolatile memory subcomponents as originally shipped from HP, assuming that no subsequent modifications have been made to the system and assuming that no applications, features, or functionality have been added to or installed on the system.

Following system shutdown and removal of all power sources from an HP Business computer system, personal data can remain on volatile system memory (DIMMs) for a finite period of time and will also remain in nonvolatile memory. Use the steps below to remove personal data from the computer, including the nonvolatile memory found in Intel-based and AMD-based system boards.



NOTE: If your tablet has a keyboard base, connect to the keyboard base before beginning steps in this chapter.

Current BIOS steps

1. Follow steps (a) through (f) below to restore the nonvolatile memory that can contain personal data. Restoring or reprogramming nonvolatile memory that does not store personal data is neither necessary nor recommended.

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.



NOTE: If the system has a BIOS administrator password, enter the password at the prompt.

- b. Select **Main**, select **Apply Factory Defaults and Exit**, and then select **Yes** to load defaults.
The computer will reboot.

- c. During the reboot, press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.



NOTE: If the system has a BIOS administrator password, enter the password at the prompt.

- d. Select the **Security** menu, select **Restore Security Settings to Factory Defaults**, and then select **Yes** to restore security level defaults.
The computer will reboot.

- e. During the reboot, press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.



NOTE: If the system has a BIOS administrator password, enter the password at the prompt.

- f. If an asset or ownership tag is set, select the **Security** menu and scroll down to the **Utilities** menu. Select **System IDs**, and then select **Asset Tracking Number**. Clear the tag, and then make the selection to return to the prior menu.

- g. If a DriveLock password is set, select the **Security** menu, and scroll down to **Hard Drive Utilities** under the **Utilities** menu. Select **Hard Drive Utilities**, select **DriveLock**, then uncheck the checkbox for **DriveLock password on restart**. Select **OK** to proceed.
- h. Select the **Main** menu, and then select **Reset BIOS Security to factory default**. Click **Yes** at the warning message.
The computer will reboot.
- i. During the reboot, press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.



NOTE: If the system has a BIOS administrator password, enter the password at the prompt.

- j. Select the **Main** menu, select **Apply Factory Defaults and Exit**, select **Yes** to save changes and exit, and then select **Shutdown**.
 - k. Reboot the system. If the system has a Trusted Platform Module (TPM) and/or fingerprint reader, one or two prompts will appear—one to clear the TPM and the other to Reset Fingerprint Sensor; press or tap **F1** to accept or **F2** to reject.
 - l. Remove all power and system batteries for at least 24 hours.
2. Complete one of the following:
- Remove and retain the storage drive.
 - or –
 - Clear the drive contents by using a third party utility designed to erase data from an SSD.
 - or –
 - Clear the contents of the drive by using the following BIOS Setup Secure Erase command option steps:



IMPORTANT: If you clear data using Secure Erase, it cannot be recovered.

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b. Select the **Security** menu and scroll down to the **Utilities** menu.
- c. Select **Hard Drive Utilities**.
- d. Under **Utilities**, select **Secure Erase**, select the hard drive storing the data you want to clear, and then follow the on-screen instructions to continue.

Nonvolatile memory usage

Nonvolatile Memory Type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data input into this memory?	How is this memory write-protected?
HP Sure Start flash (select models only)	8 MBytes	No	Yes	Provides protected backup of critical System BIOS code, EC firmware, and critical computer configuration data for select platforms that support HP Sure Start. For more information, see Using HP Sure Start (select models only) on page 94 .	Data cannot be written to this device via the host processor. The content is managed solely by the HP Sure Start Embedded Controller.	This memory is protected by the HP Sure Start Embedded Controller.
Real Time Clock (RTC) battery backed-up CMOS configuration memory	256 Bytes	No	Yes	Stores system date and time and noncritical data.	RTC battery backed-up CMOS is programmed using the Computer Setup (BIOS), or changing the Microsoft Windows date & time.	This memory is not write-protected.
Controller (NIC) EEPROM	64 KBytes (not customer accessible)	No	Yes	Stores NIC configuration and NIC firmware.	NIC EEPROM is programmed using a utility from the NIC vendor that can be run from DOS.	A utility is required to write data to this memory and is available from the NIC vendor. Writing data to this ROM in an inappropriate manner will render the NIC non-functional.
DIMM Serial Presence Detect (SPD) configuration data	256 Bytes per memory module, 128 Bytes programmable (not customer accessible)	No	Yes	Stores memory module information.	DIMM SPD is programmed by the memory vendor.	Data cannot be written to this memory when the module is installed in a computer. The specific write-protection method varies by memory vendor.
System BIOS	9 MBytes	Yes	Yes	Stores system BIOS code and computer configuration data.	System BIOS code is programmed at the factory. Code is updated when the system BIOS is updated. Configuration data and settings are input using the Computer Setup (BIOS) or a custom utility.	NOTE: Writing data to this ROM in an inappropriate manner can render the computer non-functional. A utility is required for writing data to this memory and is available on the HP website; go to http://www.hp.com/support . Select Find your

Nonvolatile Memory Type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data input into this memory?	How is this memory write-protected?
						product , and then follow the on-screen instructions.
Intel Management Engine Firmware (present only in select Elite or Z models. For more information, go to http://www.hp.com/support . Select Find your product , and then follow the on-screen instructions.)	1.5 MBytes or 7 MBytes	Yes	Yes	Stores Management Engine Code, Settings, Provisioning Data and iAMT third-party data store.	Management Engine Code is programmed at the factory. Code is updated via Intel secure firmware update utility. Unique Provisioning Data can be entered at the factory or by an administrator using the Management Engine (MEBx) setup utility. The third party data store contents can be populated by a remote management console or local applications that have been registered by an administrator to have access to the space.	The Intel chipset is configured to enforce hardware protection to block all direct read/write access to this area. An Intel utility is required for updating the firmware. Only firmware updates digitally signed by Intel can be applied using this utility.
Bluetooth flash (select products only)	2 Mbit	No	Yes	Stores Bluetooth configuration and firmware.	Bluetooth flash is programmed at the factory. Tools for writing data to this memory are not publicly available but can be obtained from the silicon vendor.	A utility is required for writing data to this memory and is made available through newer versions of the driver whenever the flash requires an upgrade.
802.11 WLAN EEPROM	4 Kbit to 8 Kbit	No	Yes	Stores configuration and calibration data.	802.11 WLAN EEPROM is programmed at the factory. Tools for writing data to this memory are not made public.	A utility is required for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.
Webcam (select products only)	64 Kbit	No	Yes	Stores webcam configuration and firmware.	Webcam memory is programmed using a utility from the device manufacturer that can be run from Windows.	A utility is required for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.
Fingerprint reader (select products only)	512 KByte flash	Yes	Yes	Stores fingerprint templates.	Fingerprint reader memory is programmed by user enrollment in HP ProtectTools Security Manager.	Only a digitally signed application can make the call to write to the flash.

Questions and answers

1. How can the BIOS settings be restored (returned to factory settings)?



IMPORTANT: Restore defaults does not securely erase any data on your hard drive. See question and answer 6 for steps to securely erase data.

Restore defaults does not reset the Custom Secure Boot keys. See question and answer 7 for information about resetting the keys.

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b. Select **Main**, and then select **Apply Factory Defaults and Exit**.
- c. Follow the on-screen instructions.
- d. Select **Main**, select **Save Changes and Exit**, and then follow the on-screen instructions.

2. What is a UEFI BIOS, and how is it different from a legacy BIOS?

The Unified Extensible Firmware Interface (UEFI) BIOS is an industry-standard software interface between the platform firmware and an operating system (OS). It is a replacement for the older BIOS architecture, but supports much of the legacy BIOS functionality.

Like the legacy BIOS, the UEFI BIOS provides an interface to display the system information and configuration settings and to change the configuration of your computer before an OS is loaded. BIOS provides a secure run-time environment that supports a Graphic User Interface (GUI). In this environment, you can use either a pointing device (Touchscreen, TouchPad, pointing stick, or USB mouse) or the keyboard to navigate and make menu and configuration selections. The UEFI BIOS also contains basic system diagnostics.

The UEFI BIOS provides functionality beyond that of the legacy BIOS. In addition, the UEFI BIOS works to initialize the computer's hardware before loading and executing the OS; the run-time environment allows the loading and execution of software programs from storage devices to provide more functionality, such as advanced hardware diagnostics (with the ability to display more detailed system information) and advanced firmware management and recovery software.

HP has provided options in Computer Setup (BIOS) to allow you to run in legacy BIOS, if required by the operating system. Examples of this requirement would be if you upgrade or downgrade the OS.

3. Where does the UEFI BIOS reside?

The UEFI BIOS resides on a flash memory chip. A utility is required to write to the chip.

4. What kind of configuration data is stored on the DIMM Serial Presence Detect (SPD) memory module? How would this data be written?

The DIMM SPD memory contains information about the memory module, such as size, serial number, data width, speed/timing, voltage, and thermal information. This information is written by the module manufacturer and stored on an EEPROM. This EEPROM cannot be written to when the memory module is installed in a computer. Third-party tools do exist that can write to the EEPROM when the memory module is not installed in a computer. Various third-party tools are available to read SPD memory.

5. What is meant by “Restore the nonvolatile memory found in Intel-based system boards”?

This message relates to clearing the Real Time Clock (RTC) CMOS memory that contains computer configuration data.

6. How can the BIOS security be reset to factory defaults and data erased?



IMPORTANT: Resetting will result in the loss of information.

These steps will not reset Custom Secure Boot Keys. See question and answer 7 for information about resetting the keys.

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b. Select **Main**, and then select **Reset Security to Factory Defaults**.
- c. Follow the on-screen instructions.
- d. Select **Main**, select **Save Changes and Exit**, and then follow the on-screen instructions.

7. How can the Custom Secure Boot Keys be reset?

Secure Boot is a feature to ensure that only authenticated code can start on a platform. If you enabled Secure Boot and created Custom Secure Boot Keys, simply disabling Secure Boot will not clear the keys. You must also select to clear the Custom Secure Boot Keys. Use the same Secure Boot access procedure you used to create the Custom Secure Boot Keys, but make the selection to clear or delete all Secure Boot Keys.

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b. Select the **Security** menu, select **Secure Boot Configuration**, and then follow the on-screen instructions.
- c. At the **Secure Boot Configuration** window, select **Secure Boot**, select **Clear Secure Boot Keys**, and then follow the on-screen instructions to continue.

Using HP Sure Start (select models only)

Select computer models are configured with HP Sure Start, a technology that continuously monitors your computer's BIOS for attacks or corruption. If the BIOS becomes corrupted or is attacked, HP Sure Start restores the BIOS to its previously safe state, without user intervention. Those select computer models ship with HP Sure Start configured and enabled. HP Sure Start is configured and already enabled so that most users can use the HP Sure Start default configuration. The default configuration can be customized by advanced users.

To access the latest documentation on HP Sure Start, go to <http://www.hp.com/support>. Select **Find your product**, and then follow the on-screen instructions.

13 Recycling

When a non-rechargeable or rechargeable battery has reached the end of its useful life, do not dispose of the battery in general household waste. Follow the local laws and regulations in your area for battery disposal.

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries. For more information about recycling programs, see the HP Web site at <http://www.hp.com/recycle>.

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